

406-11

JUN 30 1917

CROUSE-HINDS

IMPERIAL ARC HEADLIGHTS

AND

IMPERIAL INCANDESCENT HEADLIGHTS

CATALOGS Nos. 201 and 202



THE OHIO BRASS COMPANY, MANSFIELD, OHIO

GENERAL SALES AGENTS

UNION ELECTRIC COMPANY, PITTSBURGH, PA.

JOINT SALES AGENTS IN PITTSBURGH DISTRICT



CROUSE-HINDS
IMPERIAL ARC HEADLIGHTS
AND
IMPERIAL INCANDESCENT HEADLIGHTS

CATALOGS Nos. 201 and 202

EFFECTIVE JULY 15, 1915
REVISED APRIL 15, 1917



The Ohio Brass Company, Mansfield, Ohio
General Sales Agents

Union Electric Company, Pittsburgh, Pa.
Joint Sales Agents in Pittsburgh District

Notice—The Pittsburgh District includes that portion of Pennsylvania west of and including the following counties: McKean, Elk, Clearfield, Blair and Bedford; also the Ohio counties of Mahoning, Columbiana, Jefferson and Belmont.

Manufactured by

Crouse-Hinds Company

Main Office and Works

Syracuse, N. Y., U. S. A.

NEW YORK
30 Church Street

BOSTON
201 Devonshire Street

CINCINNATI
1-7 Fourth Street, W.

CHICAGO
417 S. Dearborn Street

1000
1000
1000

CROUSE-HINDS

IMPERIAL ARC HEADLIGHTS

PATENTS ISSUED AND PENDING
IN UNITED STATES AND CANADA

CATALOG No. 201

EFFECTIVE JULY 15, 1915

REVISED APRIL 15, 1917



Arc Headlights, listed herein, are manufactured by the Crouse-Hinds Company as exclusive licensee under certain pending applications and also the United States patents enumerated in schedule A on page 2; and as licensee of General Electric Company, under the patents enumerated in schedule B on page 2.

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Schedule A

Number	Date	Number	Date
733,135	July 7, 1903	1,034,686	Aug. 6, 1912
733,136	July 7, 1903	1,047,742	Dec. 17, 1912
779,068	Jan. 3, 1905	1,057,409	Apr. 1, 1913
830,767	Sept. 11, 1906	1,083,187	Dec. 30, 1913
830,768	Sept. 11, 1906	1,143,806	June 22, 1915
1,012,806	Dec. 26, 1911		

Schedule B

Number	Date	Number	Date
699,714	May 13, 1902	918,500	Apr. 20, 1909
781,937	Feb. 7, 1905	921,866	May 18, 1909
859,889	July 9, 1907	926,732	July 6, 1909
866,012	Sept. 17, 1907	926,792	July 6, 1909
867,456	Oct. 1, 1907	929,643	July 27, 1909
868,502	Oct. 15, 1907	935,896	Oct. 5, 1909
869,300	Oct. 29, 1907	948,293	Feb. 1, 1910
869,301	Oct. 29, 1907	949,353	Feb. 15, 1910
889,162	May 26, 1908	950,000	Feb. 22, 1910
889,163	May 26, 1908	964,691	July 19, 1910
890,763	June 16, 1908	973,653	Oct. 25, 1910
896,698	Aug. 18, 1908	974,227	Nov. 1, 1910
897,548	Sept 1, 1908	976,990	Nov. 29, 1910
900,718	Oct. 13, 1908	998,865	July 25, 1911
901,529	Oct. 20, 1908	1,009,608	Nov. 21, 1911
905,154	Dec. 1, 1908	1,010,402	Nov. 28, 1911
905,515	Dec. 1, 1908	1,010,900	Dec. 5, 1911
905,557	Dec. 1, 1908	1,010,942	Dec. 5, 1911
905,800	Dec. 1, 1908	1,019,443	Mar. 5, 1912
910,481	Jan. 19, 1909	1,027,162	May 21, 1912
910,670	Jan. 26, 1909	1,041,752	Oct. 22, 1912
913,209	Feb. 23, 1909	1,057,016	Mar. 25, 1913
914,891	Mar. 9, 1909	1,057,046	Mar. 25, 1913
914,939	Mar. 9, 1909	1,057,054	Mar. 25, 1913
915,052	Mar. 9, 1909	13,510	Jan. 14, 1913
917,099	Apr. 6, 1909		

10 910-B6452-TCF

CROUSE-HINDS
IMPERIAL LUMINOUS ARC HEADLIGHTS

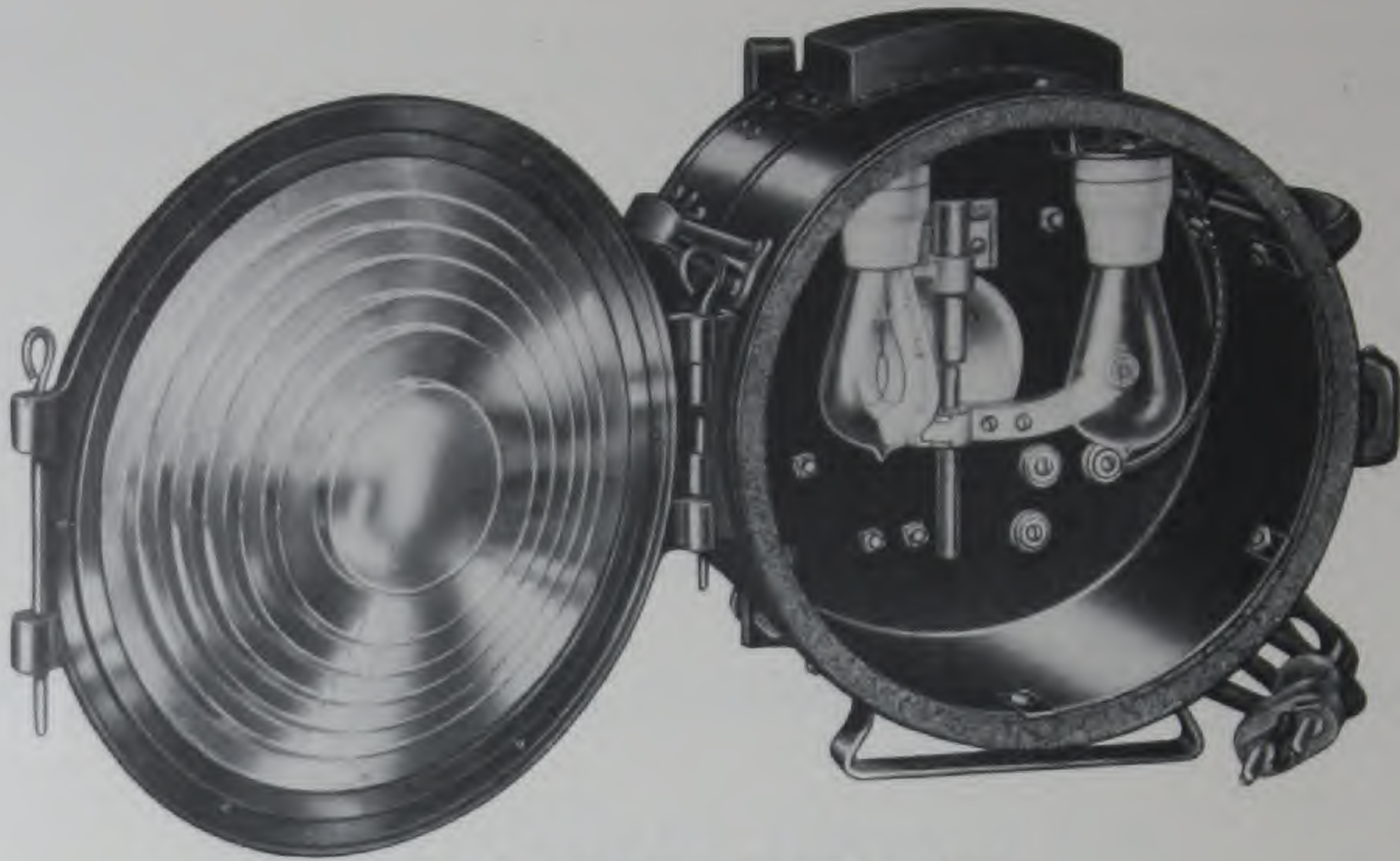
FOR ELECTRIC TRACTION SERVICE

ALSO

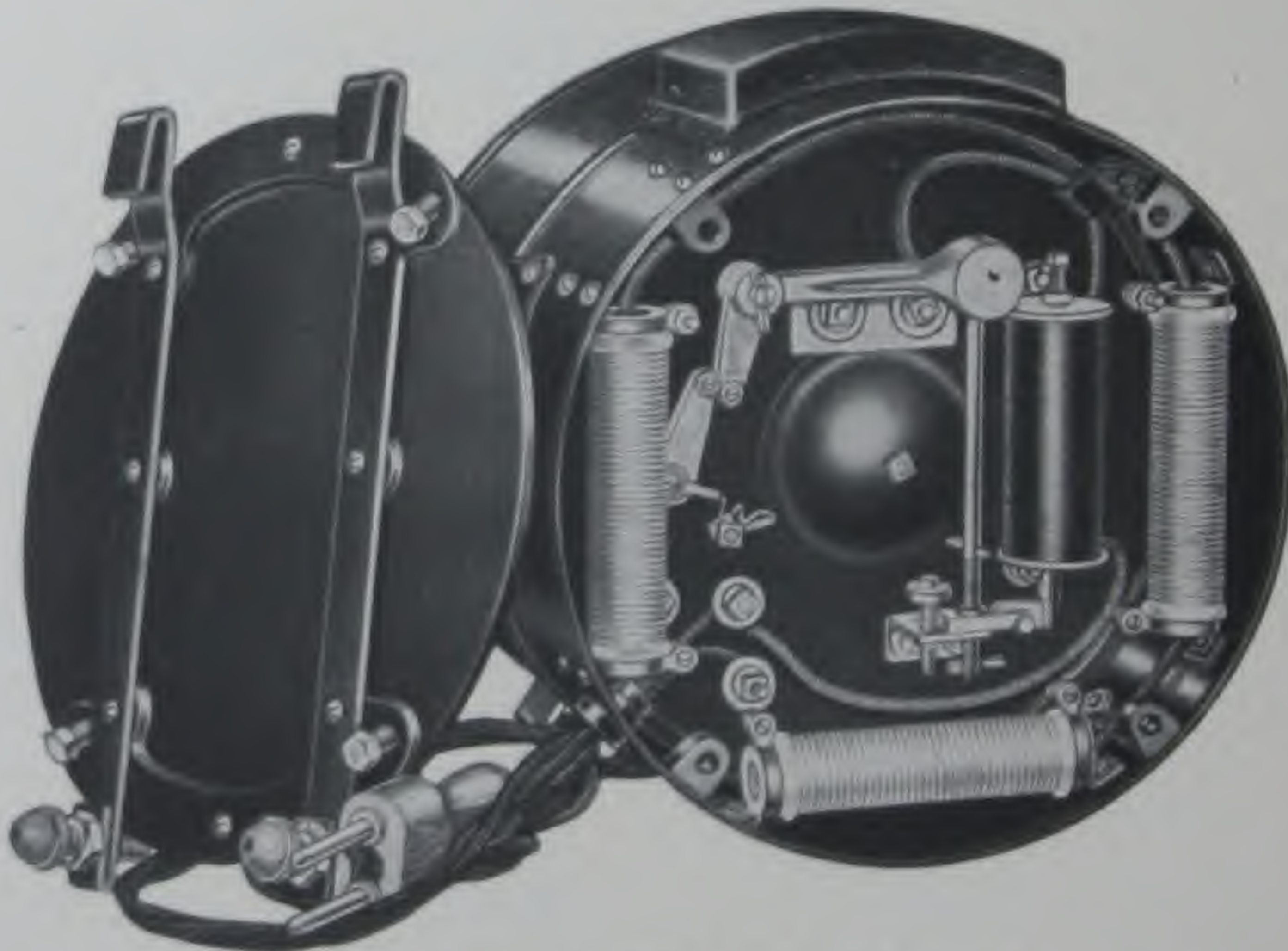
TYPES LXA AND LYA

FOR HARBOR AND RIVER SERVICE

Imperial Luminous Arc Headlights for Electric Traction Service



Type LAA Headlight with Front Door Open



Type LAA Headlight with Rear Door Removed

Imperial Luminous Arc Headlights for Electric Traction Service

Types LAA, LBA, LCA, LDA, LGA and LHA

Chief among the requirements of headlights for use on interurban cars is light that illuminates the track for a long distance, serving to guard both the public and the railroad company from accident. The mechanism should be simple and substantial, and it is desirable that adjustment of electrodes be necessary not oftener than once a day.

All these features are embodied in the Crouse-Hinds Imperial Luminous Arc Headlights—types LAA, LBA, LCA, LDA, LGA and LHA—illustrated and listed on pages 6 to 11, inclusive.

The case for each of these headlights is divided by a partition into two compartments. The front compartment contains the electrodes, electrode holders and a 4-inch, spherical, aluminum reflector. The rear compartment contains the operating mechanism.

This form of construction stiffens the case and also protects the operating mechanism from the fumes and deposits caused by the consumption of the electrodes. All parts within the case are mounted on the partition.

The case itself is of heavy, ribbed, alloy-coated iron, finished with a special high grade, water-proof black enamel. This construction offers a maximum resistance to rust and corrosion. Both front and back of case are provided with doors, which permit easy access to the interior parts.

The light is derived from especially constructed electrodes, and is far more uniform than can be secured by the use of carbons. These electrodes can go for days without renewal, as the upper one has a life of approximately 3,000 hours, while the lower will burn steadily for about 125 hours. It is advisable, however, in order to secure best results, that the lower electrode be adjusted and that the headlight be cleaned once a day. To obtain the best results, the length of arc in above headlights should be from $\frac{5}{16}$ to $\frac{3}{8}$ of an inch in length.

No inner globe is required, which saving, added to the low cost of electrodes, reduces the item of maintenance to a minimum. The interior mechanism is in the fewest practical number of parts, and so designed as to secure a maximum of strength with a minimum of weight.

Three different styles of 12-inch semaphore lenses may be used with types LAA and LBA headlights, namely, optical, inverted and "Spreadlite". The $8\frac{3}{8}$ -inch inverted semaphore lens only is used with types LGA and LHA headlights. Semaphore lenses are fully described on page 23.

Some operating departments prefer a headlight which gives a yellow beam of light, and to this end types LAA, LBA, LGA and LHA headlights may be equipped with "Noglare" semaphore lenses, and types LCA and LDA may be equipped with "Noglare" front glasses. "Noglare" glass produces a beam of light tinged with yellow, due to the absorption of rays at the blue end of the spectrum.

Imperial Luminous Arc Headlight for Electric Traction Service

Type LAA—Combination Arc and Incandescent

12-Inch Inverted Semaphore Lens in Door



For 4 Amperes, 575 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Plug and Cable.	24211	75 lbs.	\$48.70
Headlight with Single End Equipment.	24213	110 lbs.	69.00
Headlight with Double End Equipment	24215	115 lbs.	75.10

For 4 Amperes, 575 Volts D. C., Metallic Circuit

Headlight with Two Plugs and Cable	24211MC	75 lbs.	\$48.70
Headlight with Single End Equipment.	24213MC	110 lbs.	69.85
Headlight with Double End Equipment	24215MC	115 lbs.	76.80

List prices for above headlight arranged for voltages other than standard, on application.

Above list prices include one upper and one lower electrode.

Above headlight when arranged for grounded circuit is equipped with one double plug, and when arranged for metallic circuit is equipped with one double and one single plug. If specified on the order, two single plugs will be furnished in place of double plug, without extra charge. The incandescent circuit of above headlight is arranged for two 56-watt, 115-volt, Mazda lamps, which burn in series, and this arrangement will always be furnished, unless otherwise specified on order. If specified on the order, the above headlight will be arranged for any Edison base incandescent lamp from 23 to 94 watts, 115 volts, without extra charge.

Above headlight will be furnished with an optical or a "Spreadlite" semaphore lens (see page 23) in door, if specifically ordered, without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" semaphore lenses, at an advance of \$5.10 in list price.

Shipping dimensions of complete equipment, 34 x 12 x 19 inches.

Above list prices do not include incandescent lamps.

Wiring diagram, page 76, diagram No. 1.

Dimensional diagram, page 80, diagram No. 1.

Wiring equipments included in above listings are listed separately on page 64.

Assembled and detail parts, pages 84 and 87 to 92, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Luminous Arc Headlight for Electric Traction Service

Type LBA—Arc Only

12-Inch Inverted Semaphore Lens in Door

See note below*



For 4 Amperes, 575 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Plug and Cable	24311	70 lbs.	\$44.35
Headlight with Single End Equipment	24313	105 lbs.	63.80
Headlight with Double End Equipment	24315	110 lbs.	69.05

For 4 Amperes, 575 Volts D. C., Metallic Circuit

Headlight with Two Plugs and Cable	24311MC	70 lbs.	\$44.35
Headlight with Single End Equipment	24313MC	105 lbs.	64.65
Headlight with Double End Equipment	24315MC	110 lbs.	70.75

*See pages 13 and 15 for 1200-volt equipments. List prices for above headlight arranged for voltages other than standard, on application

Above list prices include one upper and one lower electrode.

Above headlight when arranged for grounded circuit is equipped with one single plug, and when arranged for metallic circuit is equipped with two single plugs.

Multiple break switch HL110S is regularly furnished with headlight equipments 24313 and 24315. Reversing switch HL150S is regularly furnished with headlight equipments 24313MC and 24315MC, as it permits reversing of current through the headlight, thereby dimming the light. If specified on the order, equipments 24313MC and 24315MC will be furnished with three-lead resistance HL5601, at an increase of \$3.55 in list price. Reversing switch HL151S (see page 69) must be used with the three-lead resistance. The three-lead resistance reduces the current consumption 35% and dims the light more effectively than the two-lead resistance.

Above headlight will be furnished with an optical or a "Spreadlite" semaphore lens (see page 23) in door, if specifically ordered, without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" semaphore lenses, at an advance of \$5.10 in list price.

Shipping dimensions of complete equipment, 34 x 12 x 19 inches.

Wiring diagrams, page 76, diagrams Nos. 2, 3 and 4.

Dimensional diagram, page 80, diagram No. 1.

Wiring equipments included in above listings are listed separately on page 65.

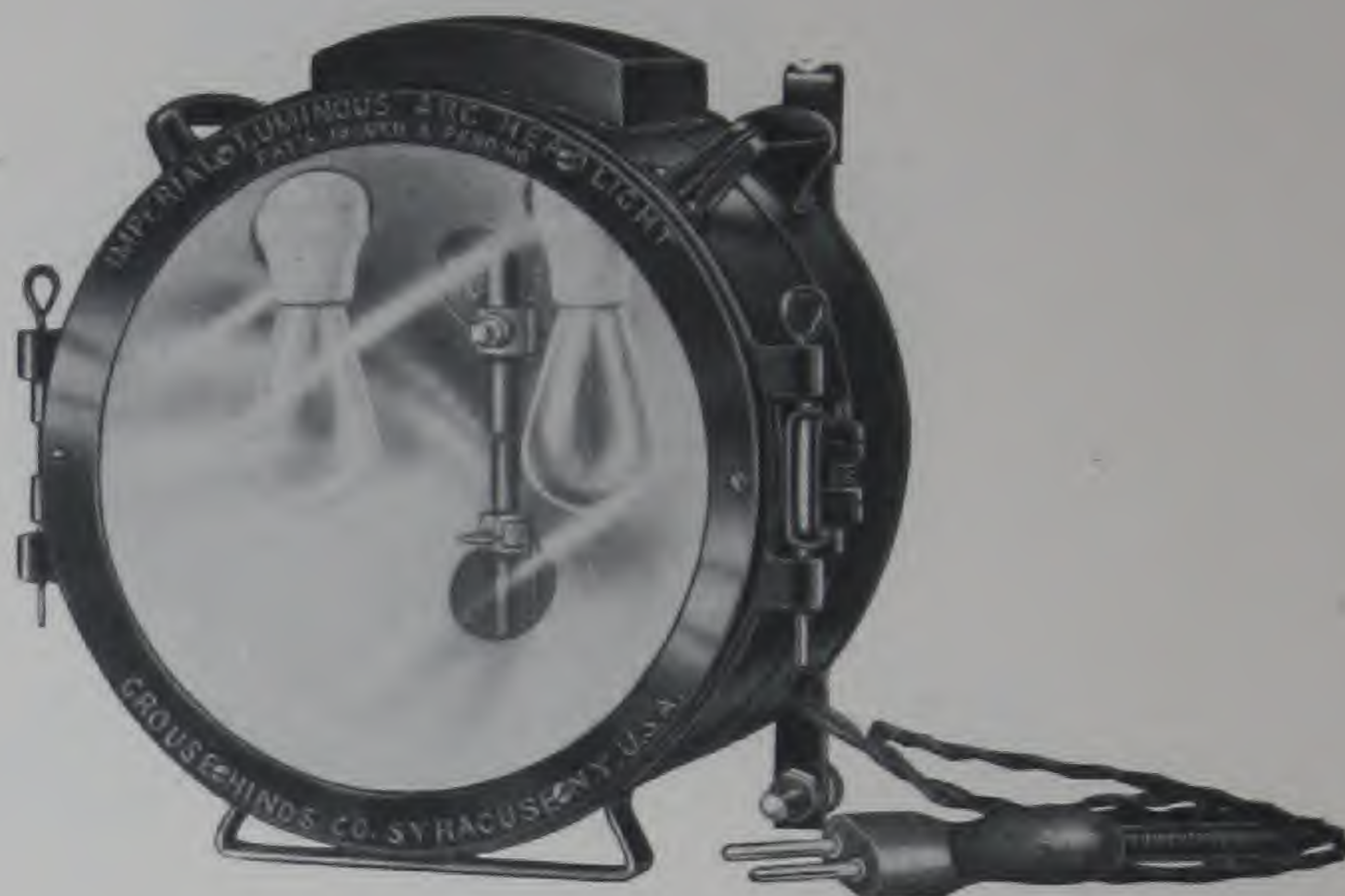
Assembled and detail parts, pages 84 and 87 to 92, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Luminous Arc Headlight for Electric Traction Service

Type LCA—Combination Arc and Incandescent

Plain Glass in Door—12-Inch Paraboloidal Nickel-Plated Copper Reflector



For 4 Amperes, 575 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Plug and Cable	24411	70 lbs.	\$47.00
Headlight with Single End Equipment	24413	105 lbs.	67.30
Headlight with Double End Equipment	24415	110 lbs.	73.40

For 4 Amperes, 575 Volts D. C., Metallic Circuit

Headlight with Two Plugs and Cable	24411MC	70 lbs.	\$47.00
Headlight with Single End Equipment	24413MC	105 lbs.	68.15
Headlight with Double End Equipment	24415MC	110 lbs.	75.10

List prices for above headlight arranged for voltages other than standard, on application. Above list prices include one upper and one lower electrode.

Above headlight when arranged for grounded circuit is equipped with one double plug, and when arranged for metallic circuit is equipped with one double and one single plug. If specified on the order, two single plugs will be furnished in place of double plug, without extra charge. The incandescent circuit of above headlight is arranged for two 56-watt, 115-volt, Mazda lamps, which burn in series, and this arrangement will always be furnished, unless otherwise specified on order. If specified on the order, this headlight will be arranged for any Edison base incandescent lamp from 23 to 94 watts, 115 volts, without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" front glass, at an advance of \$5.10 in list price.

Shipping dimensions of complete equipment, 34 x 12 x 19 inches.

Above list prices do not include incandescent lamps.

Wiring diagram, page 76, diagram No. 1.

Dimensional diagram, page 80, diagram No. 1.

Wiring equipments included in above listings are listed separately on page 64.

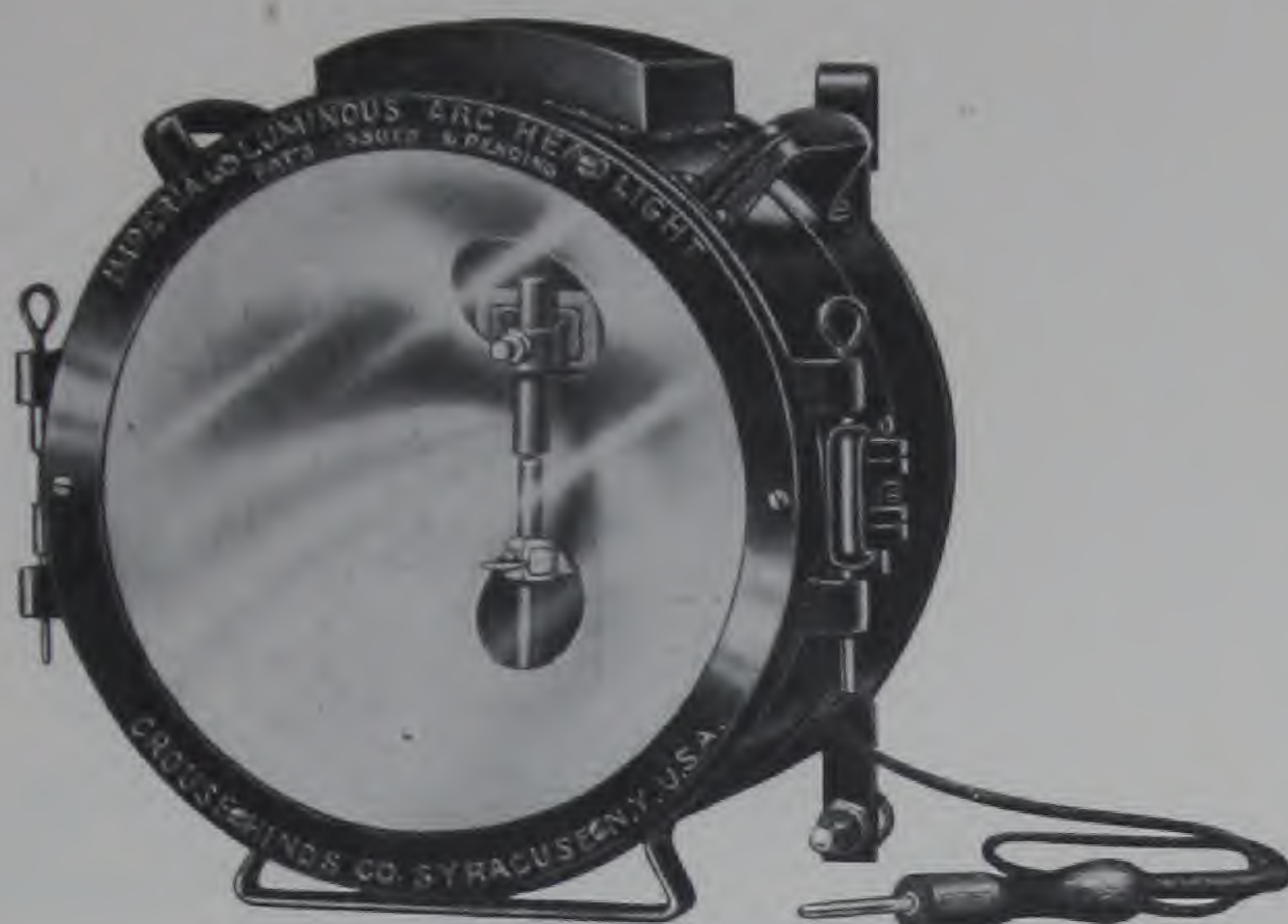
Assembled and detail parts, pages 84 and 87 to 92, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Luminous Arc Headlight for Electric Traction Service

Type LDA*—Arc Only

Plain Glass in Door—12-Inch Paraboloidal Nickel-Plated Copper Reflector



For 4 Amperes, 575 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Plug and Cable	24511	65 lbs.	\$42.65
Headlight with Single End Equipment	24513	100 lbs.	62.10
Headlight with Double End Equipment	24515	105 lbs.	67.35

For 4 Amperes, 575 Volts D. C., Metallic Circuit

Headlight with Two Plugs and Cable	24511MC	65 lbs.	\$42.65
Headlight with Single End Equipment	24513MC	100 lbs.	62.95
Headlight with Double End Equipment	24515MC	105 lbs.	69.05

*See pages 13 and 15 for 1200-volt equipments. List prices for above headlight arranged for voltages other than standard, on application.

Above list prices include one upper and one lower electrode.

Above headlight when arranged for grounded circuit is equipped with one single plug, and when arranged for metallic circuit is equipped with two single plugs.

Multiple break switch HL110S is regularly furnished with headlight equipments 24513 and 24515. Reversing switch HL150S is regularly furnished with headlight equipments 24513MC and 24515MC, as it permits the reversing of the current through the headlight, thereby dimming the light. If specified on the order, equipments 24513MC and 24515MC will be furnished with three-lead resistance HL5601, at an increase of \$3.55 in list price. Reversing switch HL151S must be used with the three-lead resistance. The three-lead resistance reduces the current consumption 35% and dims the light more effectively than the two-lead resistance.

If specified on the order, the above headlight will be furnished with "Noglare" front glass, at an advance of \$5.10 in list price.

Shipping dimensions of complete equipment, 34 x 21 x 19 inches.

Wiring diagrams, page 76, diagrams Nos. 2, 3 and 4.

Dimensional diagram, page 80, diagram No. 1.

Wiring equipments included in above listings are listed separately on page 65.

Assembled and detail parts, pages 84 and 87 to 92, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Luminous Arc Headlight for Electric Traction Service

Type LGA—Combination Arc and Incandescent

8³/₈-Inch Inverted Semaphore Lens in Door



For 4 Amperes, 575 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Plug and Cable	25011	70 lbs.	\$48.70
Headlight with Single End Equipment	25013	105 lbs.	69.00
Headlight with Double End Equipment	25015	110 lbs.	75.10

For 4 Amperes, 575 Volts D. C., Metallic Circuit

Headlight with Two Plugs and Cable	25011MC	70 lbs.	\$48.70
Headlight with Single End Equipment	25013MC	105 lbs.	69.85
Headlight with Double End Equipment	25015MC	110 lbs.	76.80

List prices for above headlight arranged for voltages other than standard, on application.

Above list prices include one upper and one lower electrode.

Above headlight when arranged for grounded circuit is equipped with one double plug, and when arranged for metallic circuit is equipped with one double and one single plug. If specified on the order, two single plugs will be furnished in place of double plug, without extra charge. The incandescent circuit of above headlight is arranged for two 56-watt, 115-volt, Mazda lamps, which burn in series, and this arrangement will always be furnished, unless otherwise specified on order. If specified on the order, this headlight will be arranged for any Edison base incandescent lamp from 23 to 94 watts, 115 volts, without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" semaphore lens, at an advance of \$3.30 in list price.

Shipping dimensions of complete equipment, 34 x 21 x 16 inches.

Above list prices do not include incandescent lamps.

Wiring diagram, page 76, diagram No. 1.

Wiring equipments included in above listings are listed separately on page 64.

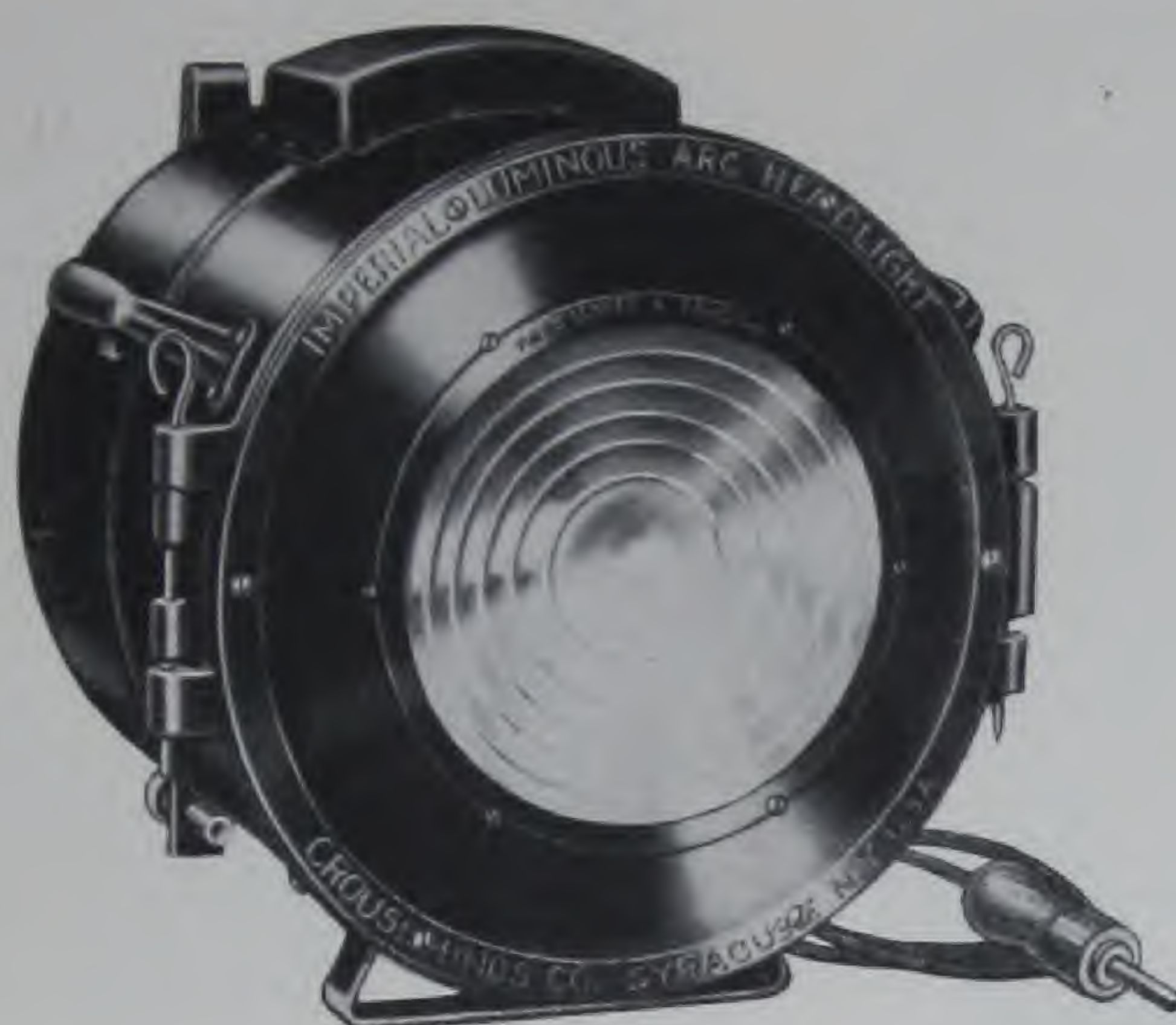
Assembled and detail parts, pages 84 and 87 to 92, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Luminous Arc Headlight for Electric Traction Service

Type LHA—Arc Only

8³/₈-Inch Inverted Semaphore Lens in Door



For 4 Amperes, 575 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Plug and Cable	25111	65 lbs.	\$44.35
Headlight with Single End Equipment	25113	100 lbs.	63.80
Headlight with Double End Equipment	25115	105 lbs.	69.05

For 4 Amperes, 575 Volts D. C., Metallic Circuit

Headlight with Two Plugs and Cable	25111MC	65 lbs.	\$44.35
Headlight with Single End Equipment	25113MC	100 lbs.	64.65
Headlight with Double End Equipment	25115MC	105 lbs.	70.75

List prices for above headlight arranged for voltages other than standard, on application.
Above list prices include one upper and one lower electrode.

Above headlight when arranged for grounded circuit is equipped with one single plug, and when arranged for metallic circuit is equipped with two single plugs.

Multiple break switch HL110S is regularly furnished with headlight equipments 25113 and 25115. Reversing switch HL150S is regularly furnished with headlight equipments 25113MC and 25115MC, as it permits the reversing of the current through the headlight, thereby dimming the light. If specified on the order, equipments 25113MC and 25115MC will be furnished with three-lead resistance HL5601, at an increase of \$3.55 in list price. Reversing switch HL151S (see page 69) must be used with the three-lead resistance. The three-lead resistance reduces the current consumption 35% and dims the light more effectively than the two-lead resistance.

If specified on the order, the above headlight will be furnished with "Noglare" semaphore lens, at an advance of \$3.30 in list price.

Shipping dimensions of complete equipment, 34 x 21 x 16 inches.

Wiring diagrams, page 76, diagrams Nos. 2, 3 and 4.

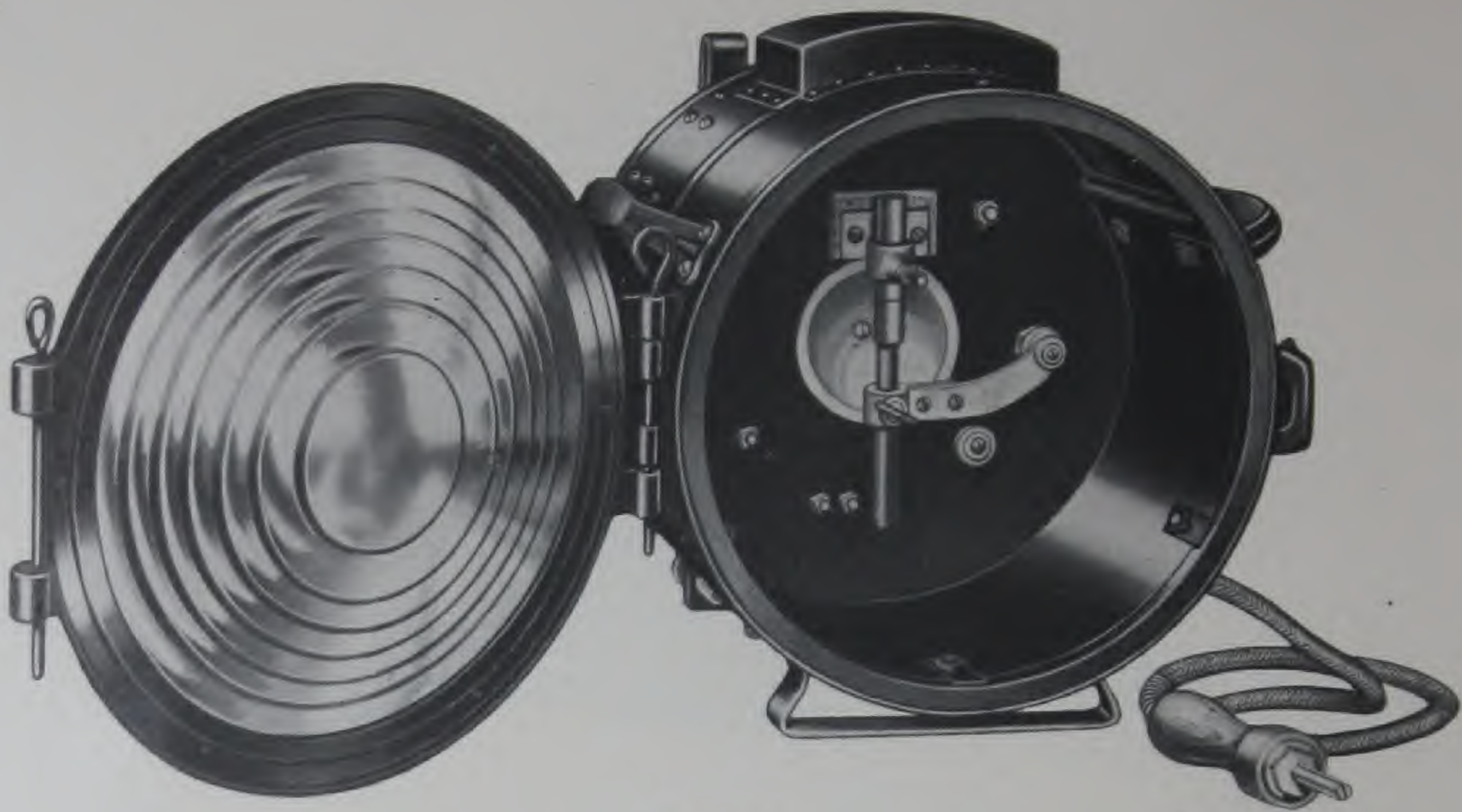
Dimensional diagram, page 80, diagram No. 2.

Wiring equipments included in above listings are listed separately on page 65.

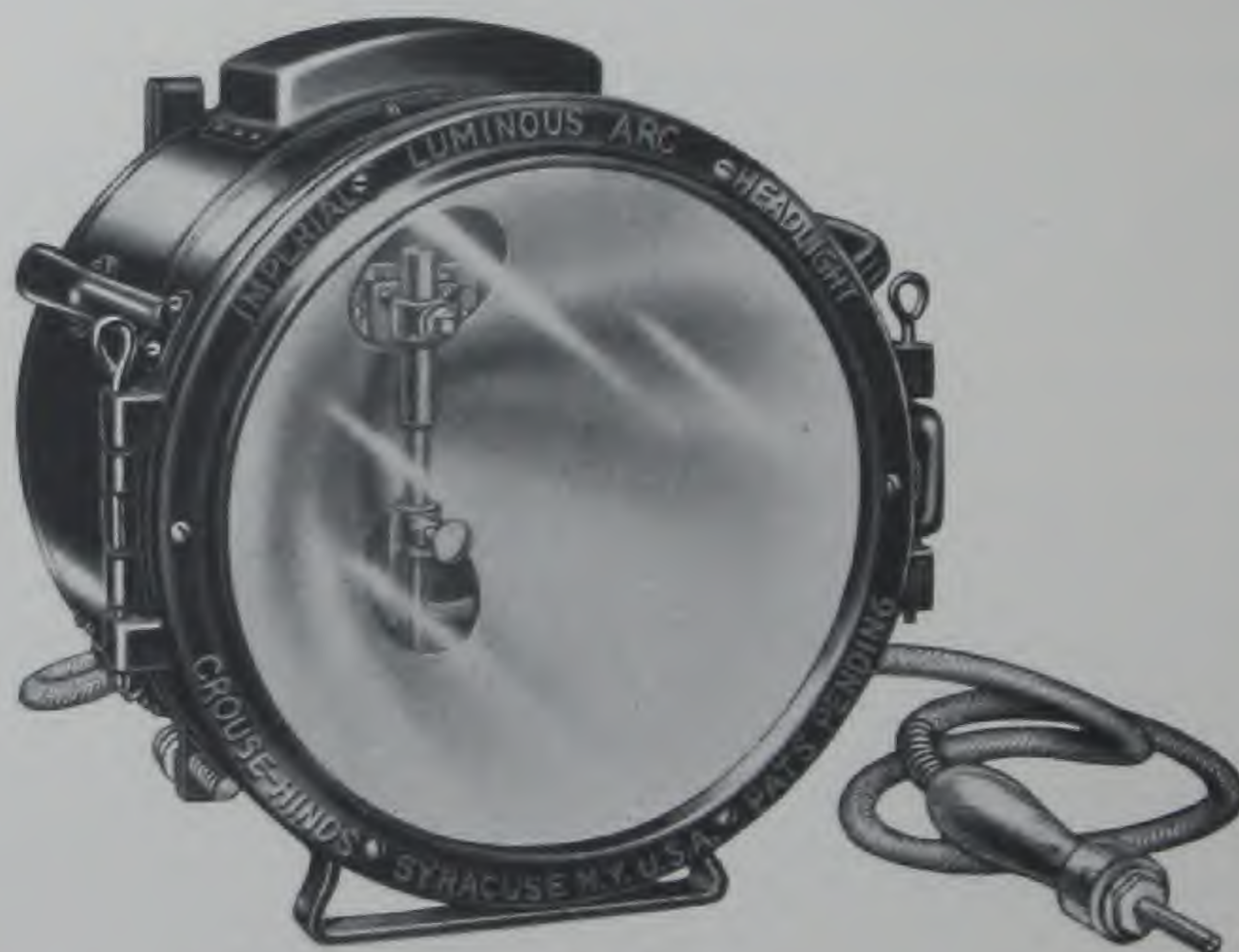
Assembled and detail parts, pages 84 and 87 to 92, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Luminous Arc Headlight for Electric Traction Service



Type LBA
For 4 Amperes, 1200 Volts D. C., Grounded Circuit



Type LDA
For 4 Amperes, 1200 Volts D. C., Grounded Circuit

Imperial Luminous Arc Headlight for Electric Traction Service

Types LBA and LDA—Arc Only

For 1200-Volt Service

To meet the demand for Arc headlights for 1200-volt service, the Crouse-Hinds Company is now listing its types LBA and LDA Imperial Luminous Arc headlights for this voltage.

The straight arc headlights only are recommended and listed. Dimming for city streets is accomplished by reversing the polarity of the arc.

The resistance, which is of the removable unit type, is made in two sections, so that the headlight may be operated on either 600 or 1200 volts. Ordinarily the two sections are connected together and a tap is brought out at the junction. In changing from 1200 to 600 volts, one section is short-circuited by a master switch or a row of contacts on the commutating switch (see wiring diagram on pages 77 and 78). When the headlight operates entirely on 1200 volts, the master switch or the commutating switch is, of course, omitted and the two sections of the resistance are connected permanently together, making a single resistance for operation on 1200 volts only.

Headlights can be arranged for metallic or grounded circuit. The former is better practice so far as contact is concerned, but the latter is safer, particularly in wet weather. The resistances, switches, fuses, etc., listed with these 1200-volt headlights are all designed for this voltage and an ample factor of safety is provided. The switches and fuses are totally enclosed and will not arc over.

The combination arc and incandescent headlights, types LAA and LCA, are not recommended, owing to the difficulty of properly insulating the incandescent lamp circuit, but will be furnished under the following conditions, prices to be quoted upon application:

(1) When there is a dynamotor on the car so that 600 volts is available for the incandescent lamp circuit.

(2) When there is a change in trolley voltage from 1200 to 600 volts at the city limits so that the incandescent lamp circuit runs from the 600-volt trolley only.

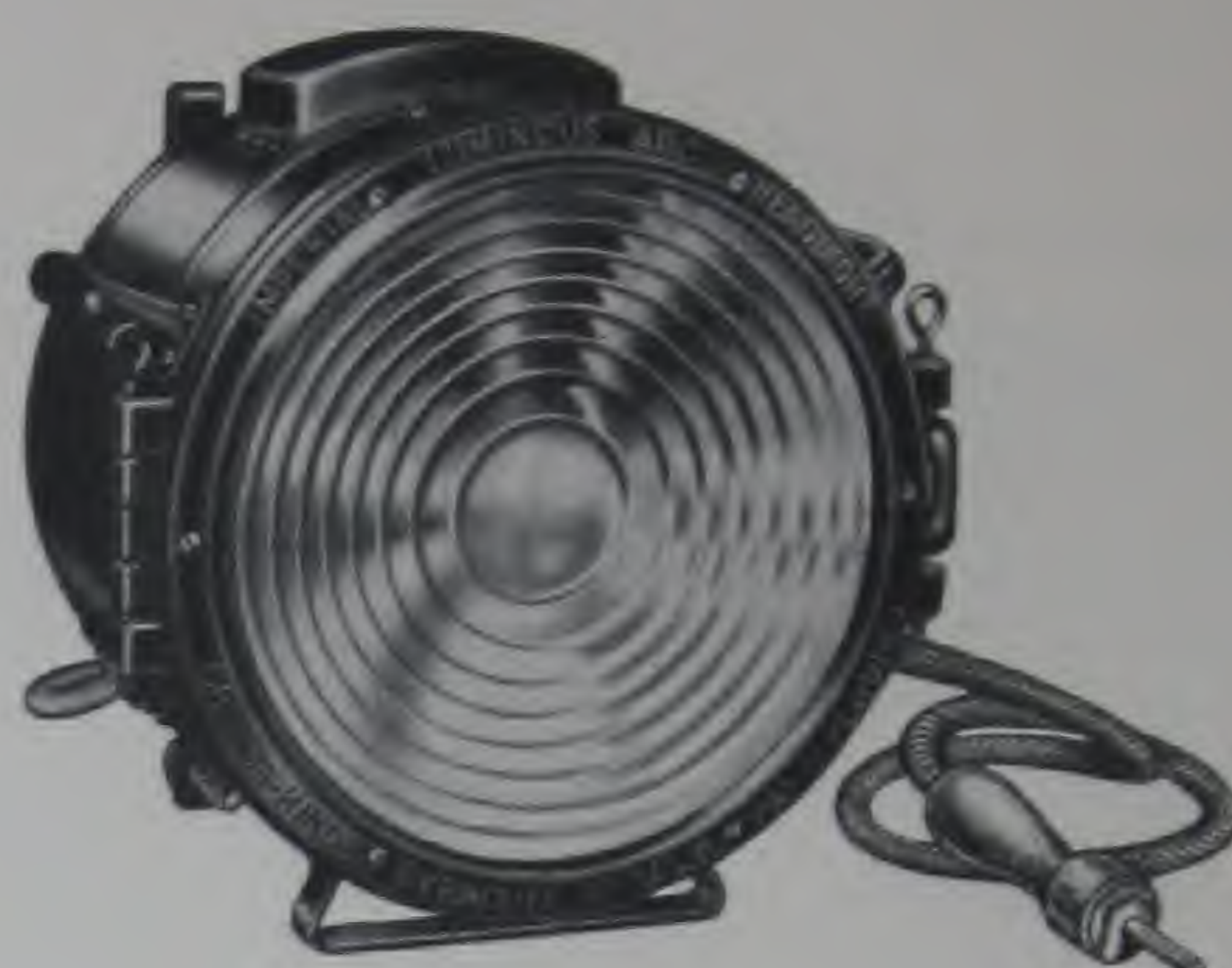
(3) When the headlight is equipped with one mogul receptacle and a mogul base lamp, not to exceed 94 watts, to be run in series with a circuit of car lights or other external resistance, all of which is outside of the headlight.

Some operating departments prefer a headlight which gives a yellow beam of light, and to this end types LAA, LBA, LGA and LHA headlights may be equipped with "Noglare" semaphore lenses, and types LCA and LDA may be equipped with "Noglare" front glasses. "Noglare" glass produces a beam of light tinged with yellow, due to the absorption of rays at the blue end of the spectrum.

Imperial Luminous Arc Headlight for Electric Traction Service

Type LBA—Arc Only

12-Inch Inverted Semaphore Lens in Door



For 4 Amperes, 1200 Volts D. C.

Grounded Circuit, No Dimming, Single End Equipment

Description	Catalog Number	List Price Each
Headlight with Plug and Cable	28655	\$48.75
Four-Lead Resistance	HL6667	56.70
Single Pole, Single Throw Switch	HL6668	*
Fuse Block	HL6669	*
Fuse	HL6670	*
Receptacle	HL2105	.85

Grounded Circuit, No Dimming, Double End Equipment

Headlight with Plug and Cable	28656	\$48.75
Four-Lead Resistance	HL6667	56.70
Two Single Pole, Single Throw Switches	HL6668	*
Fuse Block	HL6669	*
Fuse	HL6670	*
Two Receptacles	HL2105	1.70

Metallic Circuit, Reversed Polarity Dimming, Single End Equipment

Headlight with two Plugs and two Cables	28657	\$48.75
Four-Lead Resistance	HL6667	56.70
Double Pole, Double Throw (Reversing) Switch	HL6671	*
Fuse Block	HL6669	*
Fuse	HL6670	*
Two Receptacles	HL2105	1.70

Metallic Circuit, Reversed Polarity Dimming, Double End Equipment

Headlight with two Plugs and two Cables	28658	\$48.75
Four-Lead Resistance	HL6667	56.70
Two Double Pole, Double Throw, (Reversing) Switches	HL6671	*
Fuse Block	HL6669	*
Fuse	HL6670	*
Four Receptacles	HL2105	3.40

* Prices on application.

Above list prices include one upper and one lower electrode.

Above headlight will be furnished with an optical or a "Spreadlite" semaphore lens (see page 23) in door, if specifically ordered, without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" semaphore lenses, at an advance of \$5.10 in list price.

Wiring diagrams, pages 77 and 78.

Dimensional diagram, page 80, diagram No. 1.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Luminous Arc Headlight for Electric Traction Service

Type LDA—Arc Only

Plain Glass in Door—12-Inch Paraboloidal Nickel-Plated Copper Reflector



For 4 Amperes, 1200 Volts D. C.

Grounded Circuit, No Dimming, Single End Equipment

Description	Catalog Number	List Price Each
Headlight with Plug and Cable	28659	\$47.05
Four-Lead Resistance	HL6667	56.70
Single Pole, Single Throw Switch	HL6668	*
Fuse Block	HL6669	*
Fuse	HL6670	*
Receptacle	HL2105	.85

Grounded Circuit, No Dimming, Double End Equipment

Headlight with Plug and Cable	28660	\$47.05
Four-Lead Resistance	HL6667	56.70
Two Single Pole, Single Throw Switches	HL6668	*
Fuse Block	HL6669	*
Fuse	HL6670	*
Two Receptacles	HL2105	1.70

Metallic Circuit, Reversed Polarity Dimming, Single End Equipment

Headlight with two Plugs and two Cables	28661	\$47.05
Four-Lead Resistance	HL6667	56.70
Double Pole, Double Throw (Reversing) Switch	HL6671	*
Fuse Block	HL6669	*
Fuse	HL6670	*
Two Receptacles	HL2105	1.70

Metallic Circuit, Reversed Polarity Dimming, Double End Equipment

Headlight with two Plugs and two Cables.	28662	\$47.05
Four-Lead Resistance	HL6667	56.70
Two Double Pole, Double Throw, (Reversing) Switches	HL6671	*
Fuse Block	HL6669	*
Fuse	HL6670	*
Four Receptacles	HL2105	3.40

* Prices on application.

Above list prices include one upper and one lower electrode.

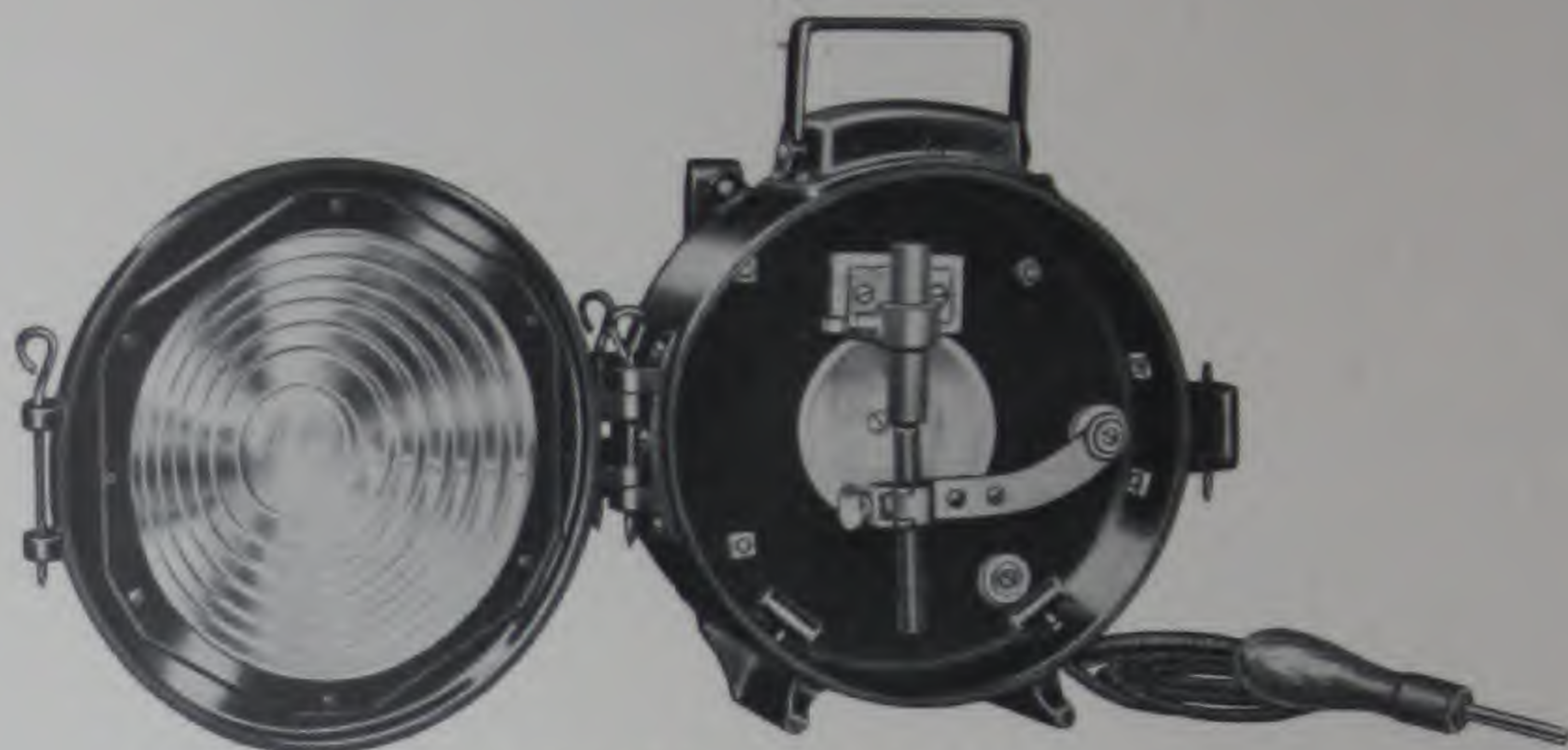
If specified on the order, the above headlight will be furnished with "Noglare" front glass, at an advance of \$5.10 in list price.

Wiring diagrams, pages 77 and 78.

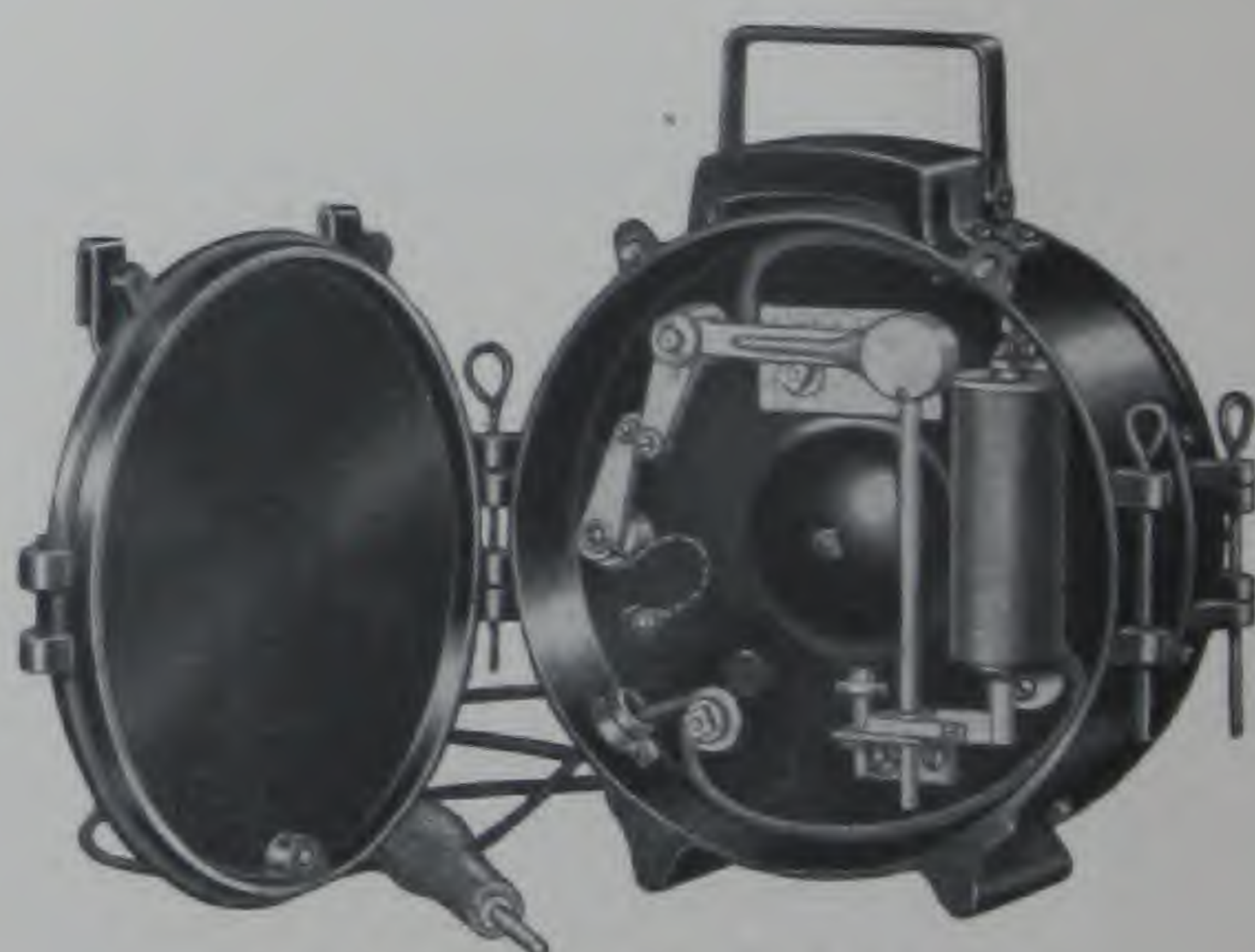
Dimensional diagram, page 80, diagram No. 1.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Luminous Arc Headlights for Electric Traction Service



Type LK Headlight with Front Door Open



Type LK Headlight with Back Door Open

Imperial Luminous Arc Headlights for Electric Traction Service

Types LK and LP

Types LK and LP headlights, illustrated and listed on pages 18, 19 and 20 have the two-compartment feature. The front compartment contains the electrodes, electrode holders and a 4-inch, spherical, aluminum reflector. The rear compartment contains the operating mechanism.

This two-compartment form of construction protects the operating mechanism from the fumes and deposits caused by the consumption of the electrodes.

All parts within the case are mounted on the partition.

These two headlights have one-piece, cast-iron cases, including the partition. The case is provided with a front and a back door, affording easy access to the interior parts. Type LK is also made with a reinforced sheet steel case. Case and door are finished inside and out with high grade, water-proof black enamel.

The light is derived from especially constructed electrodes, and is far more uniform than can be secured by the use of carbons. These electrodes can go for days without renewal, as the upper one has a life of approximately 3,000 hours, while the lower will burn steadily for about 100 hours. It is advisable, however, in order to secure best results, that the lower electrode be adjusted and that the headlight be cleaned once a day. To obtain the best results, the length of arc in above headlights should be from $\frac{5}{16}$ to $\frac{3}{8}$ of an inch in length.

No inner globe is required, which saving, added to the low cost of electrodes, reduces the item of maintenance to a minimum.

The interior mechanism is in the fewest practical number of parts, and so designed as to secure a maximum of strength with a minimum of weight.

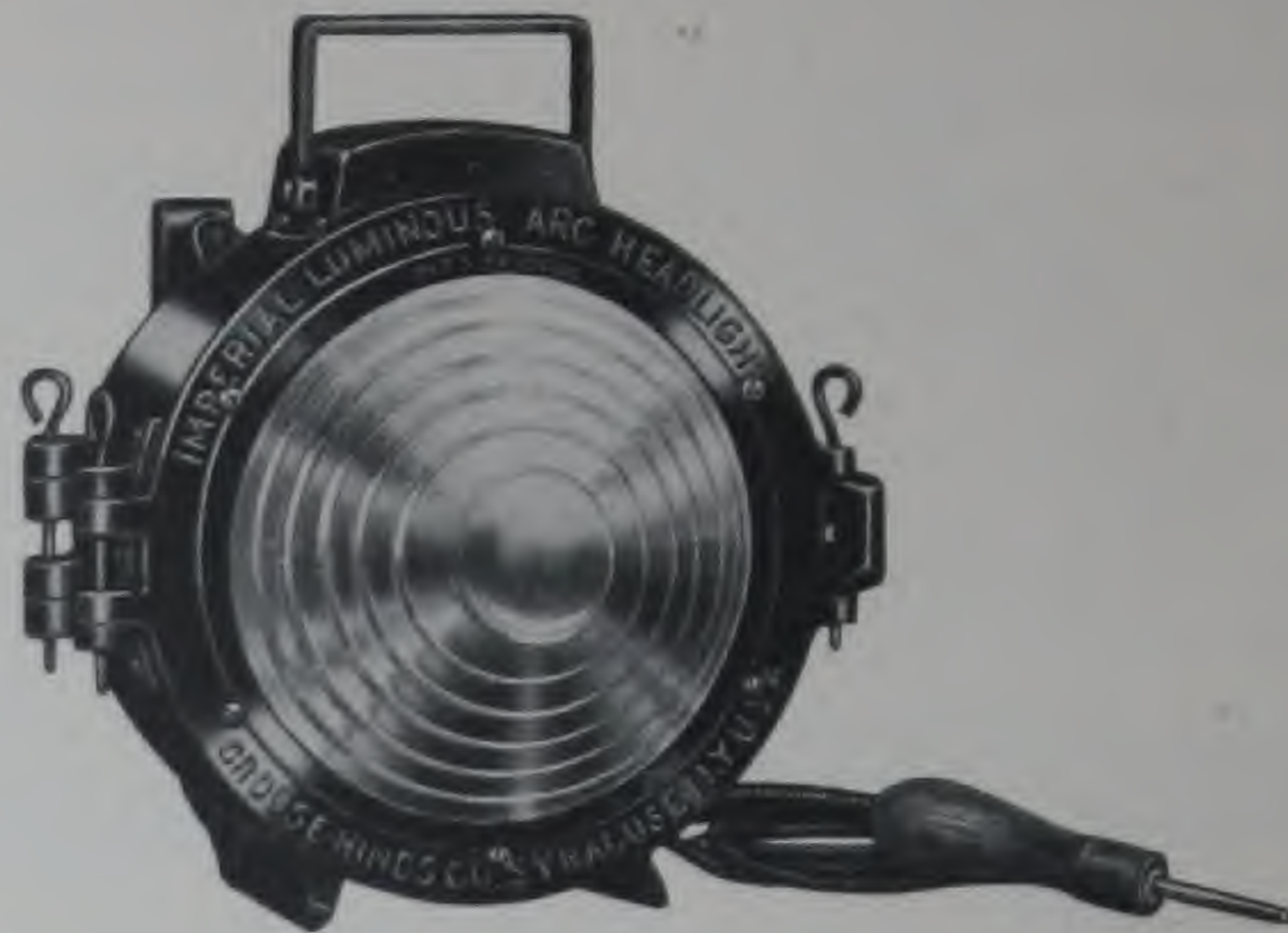
The only difference between types LK and LP headlights is that the former is provided with 6-inch dash hangers, while the latter is arranged for bolting directly to the dash of the car. In type LP headlight, the rear door is drilled and tapped for $\frac{1}{2}$ -inch conduit, through which the lead wire enters the headlight to connect with a contact plate secured to the inner surface of the door. This contact plate engages a spring contact, which connects with the mechanism, thereby completing the circuit.

Some operating departments prefer a headlight which gives a yellow beam of light, and to this end types LK and LP may be equipped with "Noglare" semaphore lenses. A "Noglare" semaphore lens produces a beam of light tinged with yellow, due to the absorption of rays at the blue end of the spectrum.

Imperial Luminous Arc Headlight for Electric Traction Service

Type LK—Arc Only

8³/₈-Inch Optical Semaphore Lens in Door



For 4 Amperes, 575 Volts D. C., Grounded Circuit—Cast-Iron Case

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Plug and Cable	27101	55 lbs.	\$37.85
Headlight with Single End Equipment	27105	85 lbs.	57.30
Headlight with Double End Equipment	27115	80 lbs.	62.55

For 4 Amperes, 575 Volts D. C., Metallic Circuit—Cast-Iron Case

Headlight with Two Plugs and Cable	27101MC	55 lbs.	\$37.85
Headlight with Single End Equipment	27105MC	85 lbs.	58.15
Headlight with Double End Equipment	27115MC	80 lbs.	64.25

For 4 Amperes, 575 Volts D. C., Grounded Circuit—Sheet Steel Case

Headlight with Plug and Cable	27116	45 lbs.	\$37.85
Headlight with Single End Equipment	27117	75 lbs.	57.30
Headlight with Double End Equipment	27118	80 lbs.	62.55

For 4 Amperes, 575 Volts D. C., Metallic Circuit—Sheet Steel Case

Headlight with Two Plugs and Cable	27116MC	45 lbs.	\$37.85
Headlight with Single End Equipment	27117MC	75 lbs.	58.15
Headlight with Double End Equipment	27118MC	80 lbs.	64.25

For important information, see notes on opposite page.

Imperial Luminous Arc Headlight for Electric Traction Service

Type LK—Arc Only—Continued

8³/₈-Inch Optical Semaphore Lens in Door

For 2 Amperes, 575 Volts D. C., Grounded Circuit—Cast-Iron Case

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Plug and Cable	27141	50 lbs.	\$28.35
Headlight with Single End Equipment	27145	80 lbs.	44.55
Headlight with Double End Equipment	27155	85 lbs.	46.55

For 2 Amperes, 575 Volts D. C., Metallic Circuit—Cast-Iron Case

Headlight with Two Plugs and Cable	27141MC	50 lbs.	\$28.35
Headlight with Single End Equipment	27145MC	80 lbs.	45.40
Headlight with Double End Equipment	27155MC	85 lbs.	48.25

For 2 Amperes, 575 Volts D. C., Grounded Circuit—Sheet Steel Case

Headlight with Plug and Cable	27156	40 lbs.	\$28.35
Headlight with Single End Equipment	27157	70 lbs.	44.55
Headlight with Double End Equipment	27158	75 lbs.	46.55

For 2 Amperes, 575 Volts D. C., Metallic Circuit—Sheet Steel Case

Headlight with Two Plugs and Cable	27156MC	40 lbs.	\$28.35
Headlight with Single End Equipment	27157MC	70 lbs.	45.40
Headlight with Double End Equipment	27158MC	75 lbs.	48.25

List prices for above headlight arranged for voltages other than standard, on application. Above list prices include one upper and one lower electrode.

Above headlight when arranged for grounded circuit is equipped with one single plug, and when arranged for metallic circuit is equipped with two single plugs.

Multiple break switch HL110S is regularly furnished with headlight equipments 27105, 27115, 27117 and 27118. Reversing switch HL150S is regularly furnished with headlight equipments 27105MC, 27115MC, 27117MC and 27118MC, as it permits the reversing of the current through the headlight, thereby dimming the light. One-way snap switch HL110 is regularly furnished with headlight equipments listed on this page. If specified on the order, multiple break switch HL110S will be furnished with headlight equipments listed on this page, at an increase of \$3.25 in list price. If specified on the order, reversing switch HL150S will be furnished with equipments 27145MC, 27155MC, 27157MC and 27158MC, at an increase of \$3.25 in list price. If specified on the order, equipments 27105MC, 27115MC, 27117MC and 27118MC will be furnished with three-lead resistance HL5601, at an increase of \$3.55 in list price. Reversing switch HL151S must be used with the three-lead resistance. The three-lead resistance reduces the current consumption 35% and dims the light more effectively than the two-lead resistance.

If specified on the order, the above headlight will be furnished with "Noglare" semaphore lens, at an advance of \$3.30 in list price.

Shipping dimensions of complete equipment, 35 x 17¹/₂ x 11¹/₂ inches.

Wiring diagrams, page 76, diagram No. 2.

Dimensional diagram, page 80, diagram No. 3.

Wiring equipments included in above listings are listed separately on page 65.

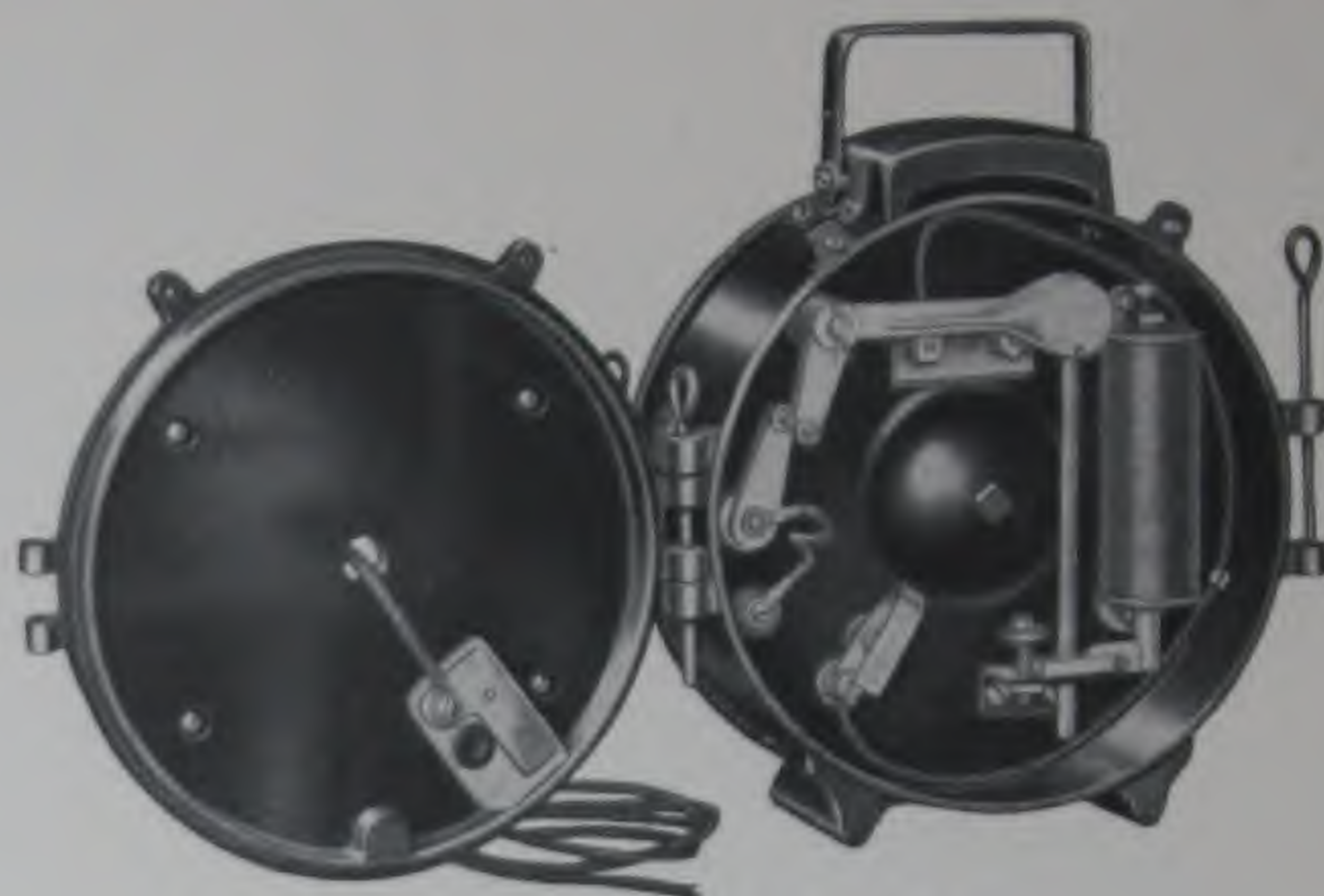
Assembled and detail parts, pages 85 and 87 to 92, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Luminous Arc Headlight for Electric Traction Service

Type LP—Arc Only

8³/₈-Inch Optical Semaphore Lens in Door



Type LP Headlight with Back Door Open

Type LP headlight is arranged for bolting directly to the dash of the car.

The rear door is drilled and tapped for 1/2-inch conduit, through which the lead wire enters the headlight and connects with a contact plate secured to the inner surface of the door. This contact plate engages a spring contact, which connects with the mechanism, thereby completing the circuit.

For 4 Amperes, 575 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Cable	27201	55 lbs.	\$37.85

For 2 Amperes, 575 Volts D. C., Grounded Circuit

Headlight with Cable	27241	55 lbs.	\$28.35
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List prices for above headlight arranged for voltages other than standard, on application. Above list prices include one upper and one lower electrode.

Above headlight is regularly furnished without plug, as it is supposed to be permanently connected in series with a resistance. If specified on the order for the headlight, a single plug will be furnished at \$.95 list.

If specified on the order, the above headlight will be furnished with "Noglare" semaphore lens, at an advance of \$3.30 in list price.

Shipping dimensions of complete equipment, 27 x 17¹/₂ x 11³/₄ inches.

Wiring diagram, page 76, diagram No 2.

Dimensional diagram, page 80, diagram No. 3.

Wiring equipments adaptable to above headlight are listed on page 65.

Assembled and detail parts, pages 85 and 87 to 92, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Luminous Arc Headlight for Harbor and River Service

Type LXA—Arc Only

12-Inch Optical Semaphore Lens in Door



Type LXA headlight is suitable as a headlight to assist river and harbor craft in making landings, but is not intended for use as a searchlight.

The above headlight consists of a type LBA Luminous Arc headlight and a special mounting. The latter is so constructed that the headlight can be revolved and tilted, thereby making it possible to project the rays of light in any direction. Furthermore, the headlight can be mounted on the pilot house and operated from within.

The case is of special alloy-coated iron, black enameled; while the special mounting and its control parts are of cast or wrought iron, black enameled. This construction effectually prevents rust and corrosion.

For 4 Amperes, Direct Current, Metallic Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Complete Equipment for 110 Volts, including Self-Contained Resistance	25301	140 lbs.	\$125.00
Complete Equipment for 220 Volts, including External Resistance	25321	155 lbs.	128.00
Complete Equipment for 250 Volts, including External Resistance	25341	155 lbs.	128.00
Complete Equipment for 500 Volts, including External Resistance	25361	155 lbs.	131.00

Above list prices include one upper and one lower electrode.

Each equipment consists of one headlight with special mounting, one main resistance, one fuse, one fuse block and one multiple break switch.

If specified on the order, the above headlight will be furnished with an inverted or a "Spread-lite" semaphore lens (see page 23), without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" semaphore lenses, at an advance of \$5.10 in list price.

Shipping dimensions, 36 x 20 x 18 inches.

Dimensional diagram, page 50 diagram No. 4.

When ordering headlight, state maximum and minimum voltage of circuit.

Imperial Luminous Arc Headlight for Harbor and River Service

Type LYA—Arc Only

12-Inch Optical Semaphore Lens in Door



Type LYA headlight is suitable as a headlight to assist river and harbor craft in making landings, but is not intended for use as a searchlight.

The above headlight consists of a type LBA Luminous Arc headlight and a tripod mounting. The latter can be secured to the deck, and is so constructed as to permit the headlight being revolved and tilted, thereby making it possible to project the rays of light in any direction.

The case is of special alloy-coated iron, black enameled; while the tripod mounting and its control parts are of cast or wrought iron, black enameled. This construction effectually prevents rust and corrosion.

For 4 Amperes, Direct Current, Metallic Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Complete Equipment for 110 Volts, including Self-Contained Resistance	25401	130 lbs.	\$115.00
Complete Equipment for 220 Volts, including External Resistance	25421	145 lbs.	118.00
Complete Equipment for 250 Volts, including External Resistance	25441	145 lbs.	118.00
Complete Equipment for 500 Volts, including External Resistance	25461	145 lbs.	123.00

Above list prices include one upper and one lower electrode.

Each equipment consists of one headlight with mounting, one main resistance, one fuse, one fuse block and one multiple break switch.

If specified on the order, the above headlight will be furnished with "Noglare" semaphore lens, at an advance of \$5.10 in list price.

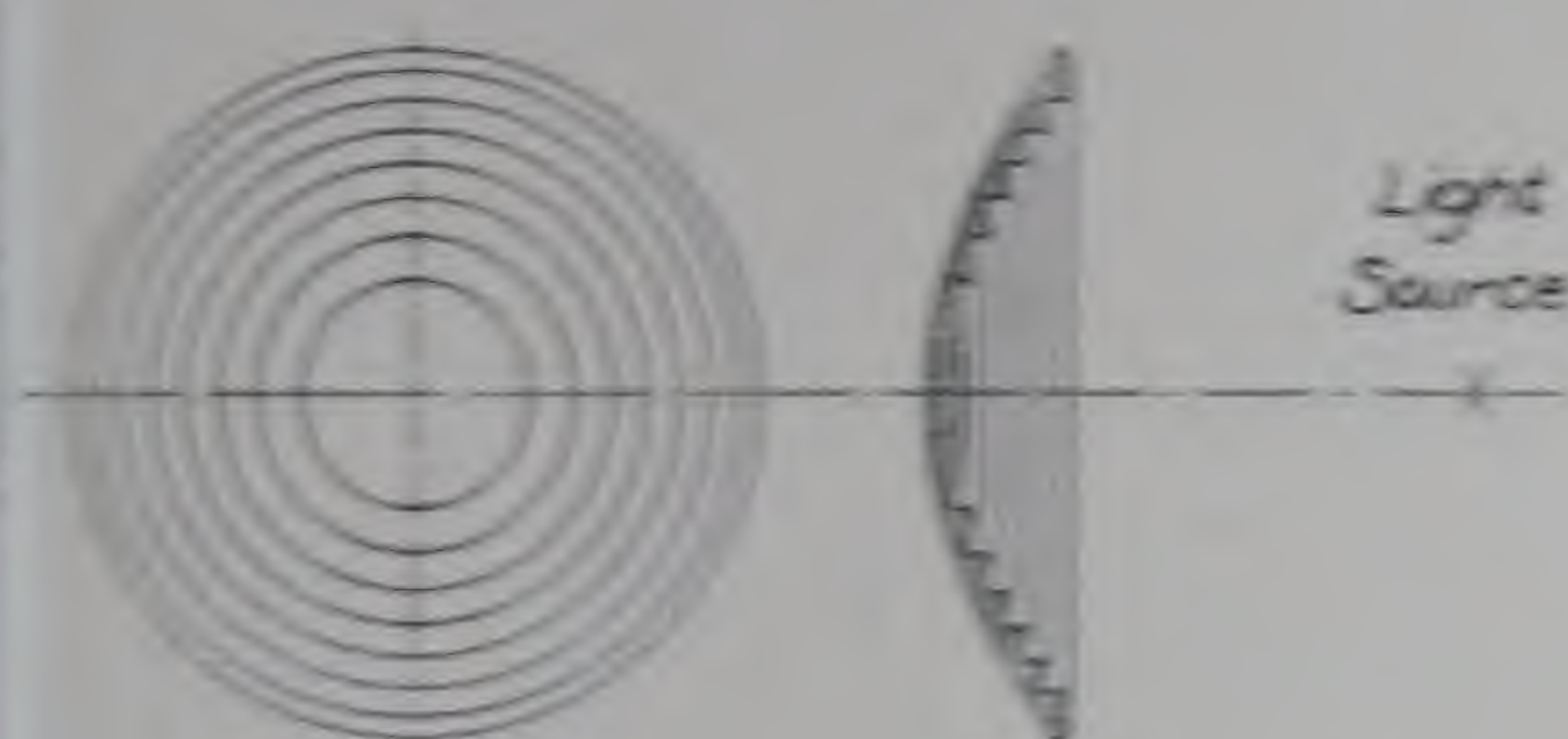
Dimensions—Total height, mounted, 59 inches; shipping dimensions, 40 x 20 x 18 inches.

When ordering headlight, state maximum and minimum voltage of circuit.

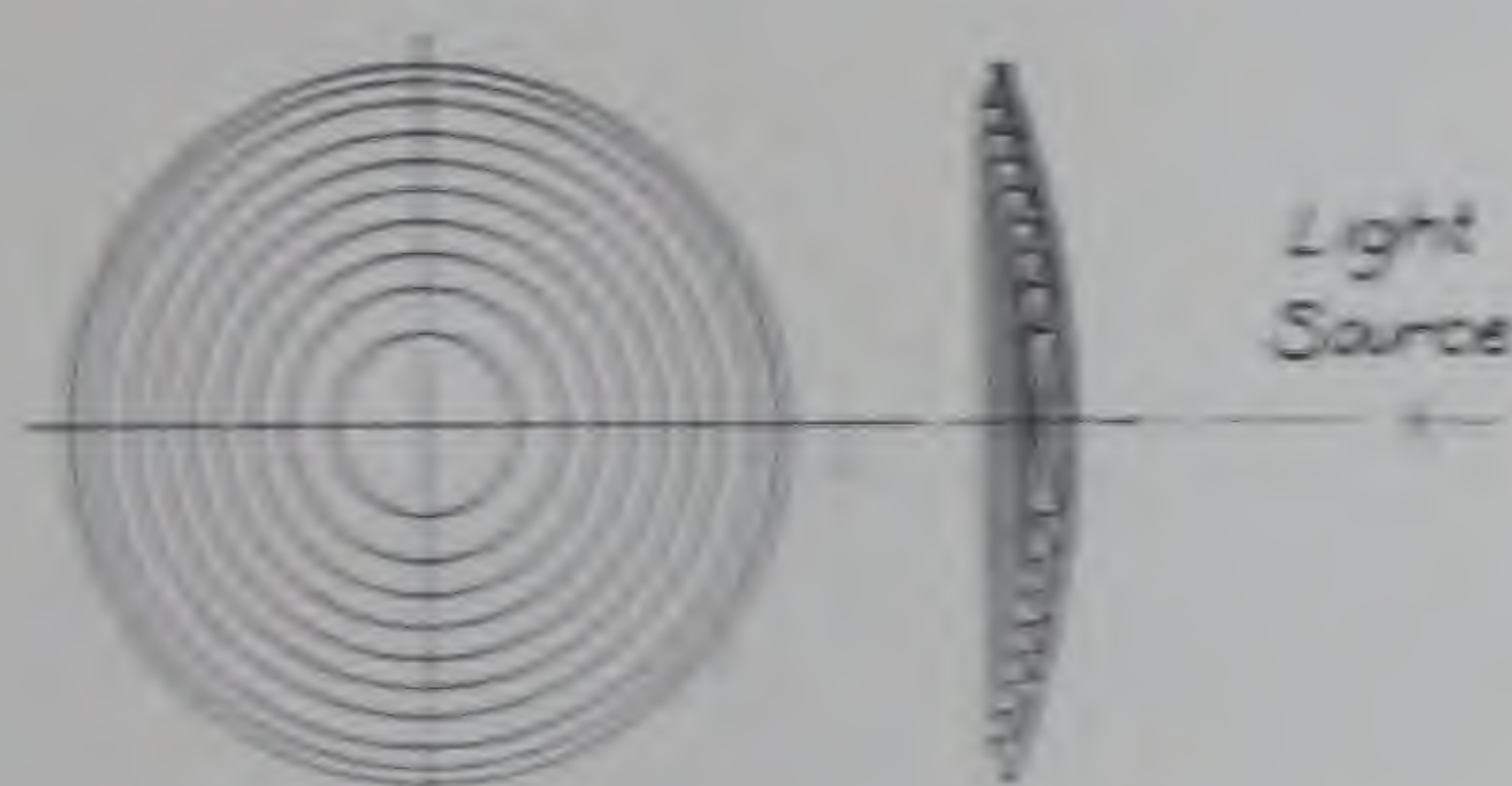
Semaphore Lenses

For Imperial Luminous Arc Headlight

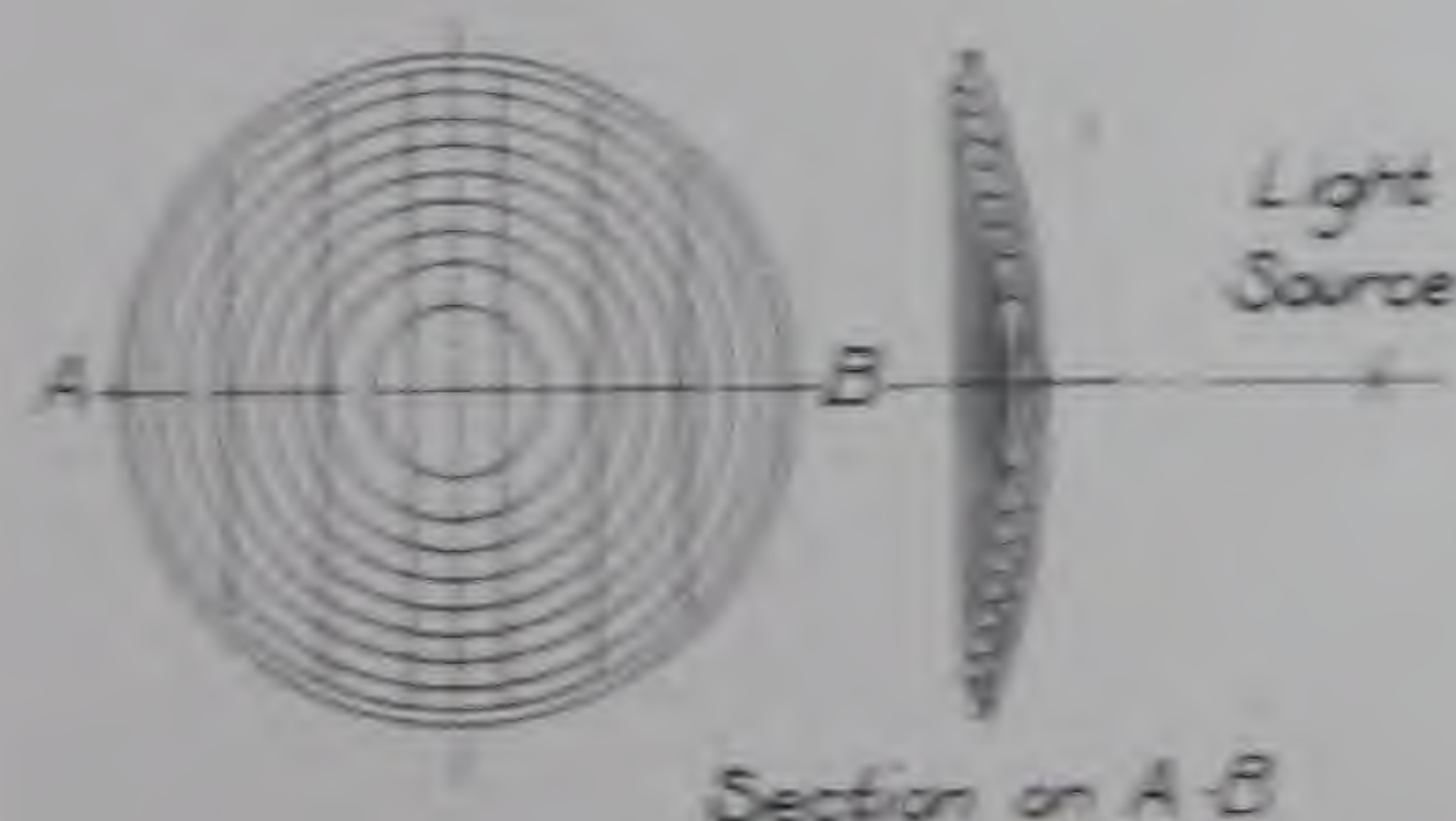
Of the three styles of semaphore lenses—inverted, optical and “Spreadlite”—the inverted is the one most generally used and is considered standard. This lens will be furnished with all headlights unless another lens is specified. Each lens has its special application, as listed below:



Optical Semaphore Lens—The optical semaphore lens throws a long, narrow, penetrating ray of light well confined to the track. The spread of the beam is about three feet per 100. This lens is ideally suited to high speed cars operating on fairly straight tracks, where a maximum “pick-up” distance is desired.



Inverted Semaphore Lens—The inverted semaphore lens gives a spread of beam about six feet per 100, which means that not only the track, but the entire right-of-way is illuminated. The “pick-up” distance is slightly less than with the optical semaphore. This lens and also the “Spreadlite” semaphore lens (described below), is protected against breakage, because of the fact that no part of the lens projects beyond the door frame.



“Spreadlite” Semaphore Lens—The “Spreadlite” semaphore lens is for use on moderate speed cars which operate along crooked right-of-ways with numerous intersecting highways. The spread of the beam is about twenty-six feet per 100. This wide beam lights up the right-of-way, and both sides thereof as well, and permits the motorman to see to a certain extent, around curves and along the intersecting highways. Furthermore, the beam is so broad that the natural wandering of the arc is not noticeable.

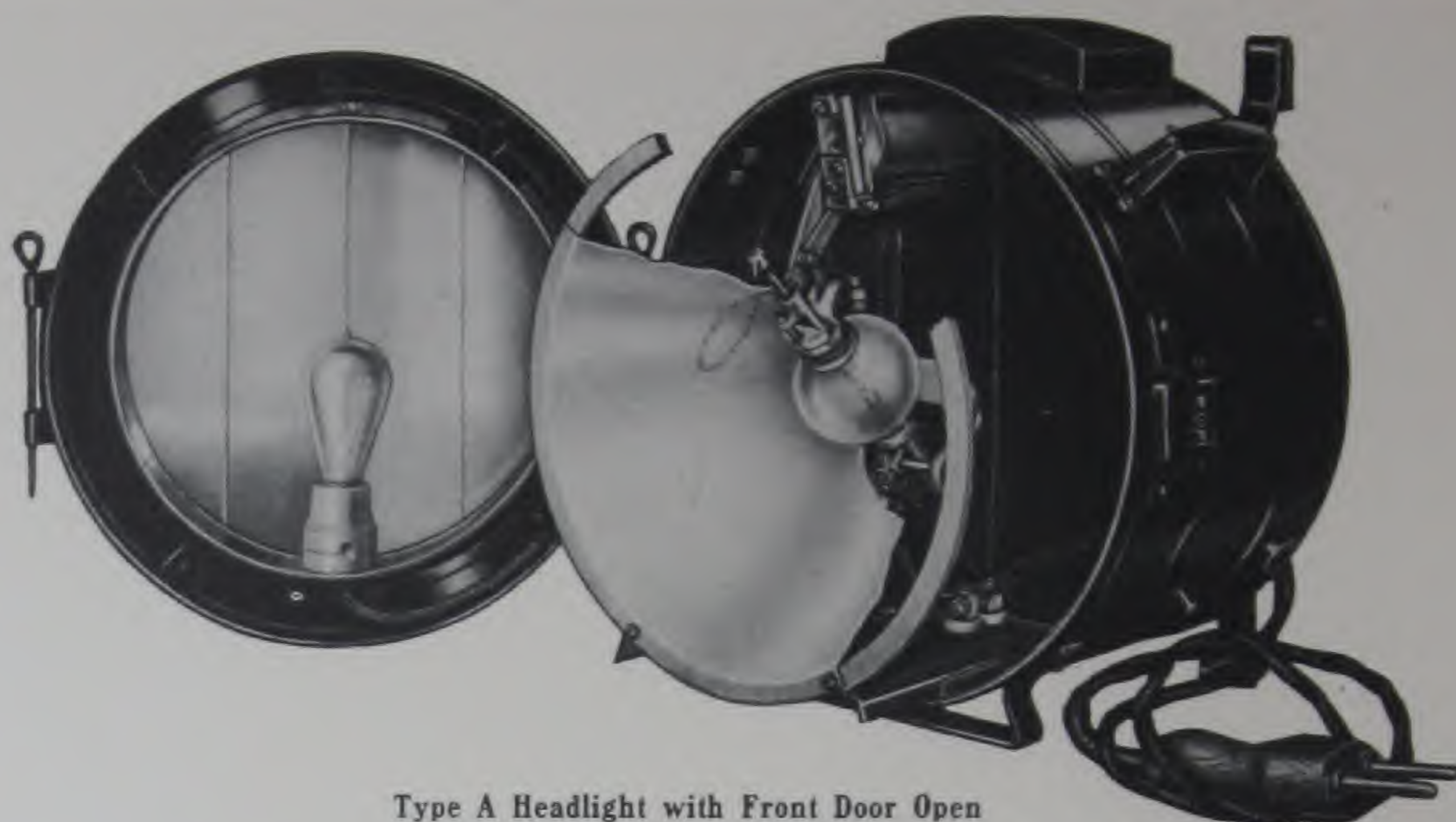
Imperial Carbon Arc Headlights for Interurban Service



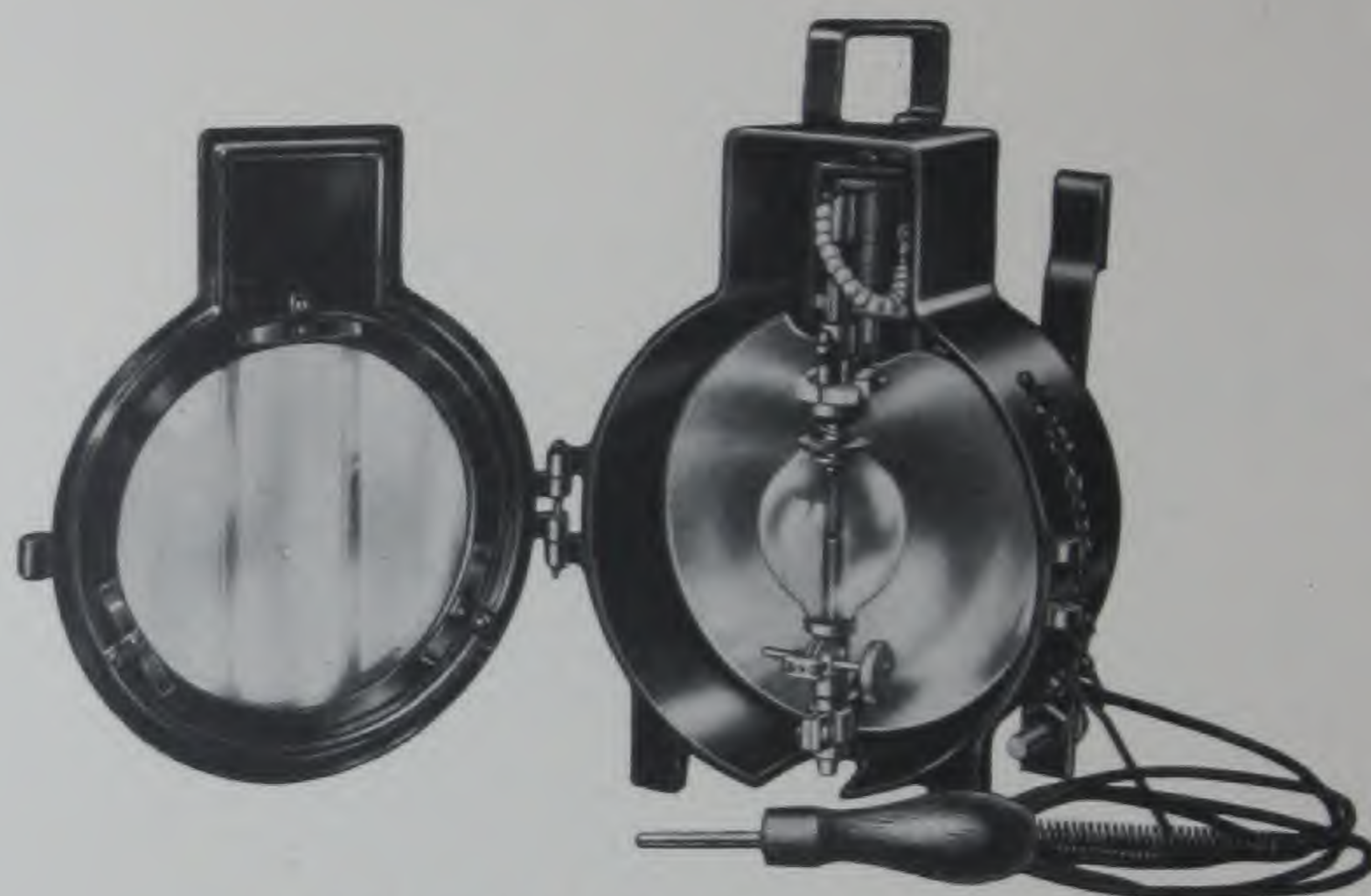
Type B Installed

CROUSE-HINDS
IMPERIAL CARBON ARC HEADLIGHTS
FOR ELECTRIC TRACTION SERVICE

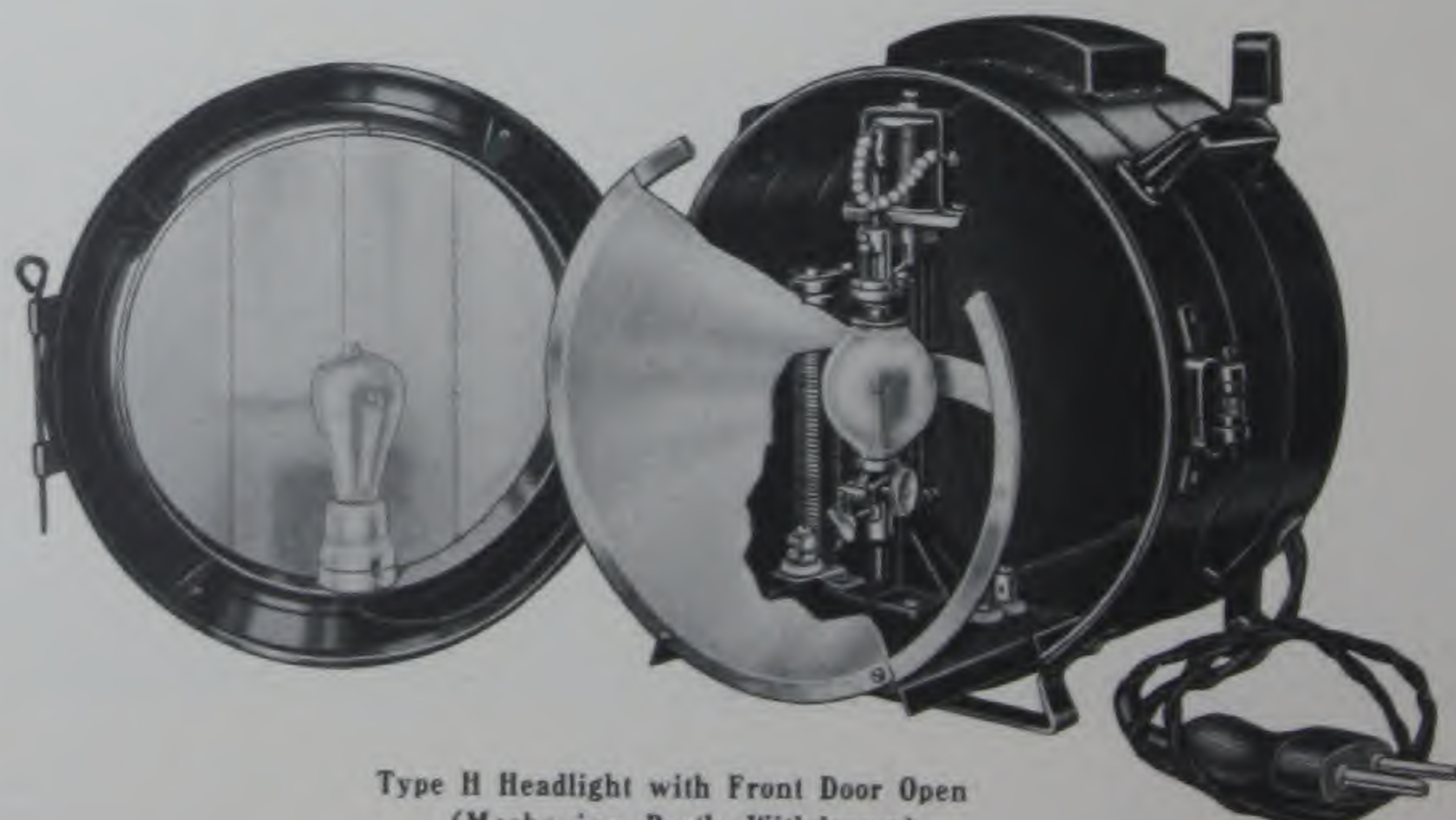
Imperial Carbon Arc Headlights for Electric Traction Service



Type A Headlight with Front Door Open
(Mechanism Partly Withdrawn)



Type V Headlight with Front Door Open



Type H Headlight with Front Door Open
(Mechanism Partly Withdrawn)

Imperial Carbon Arc Headlights for Electric Traction Service

Types A, B, C, D, H, J, K, L, P, Q and V

The CROUSE-HINDS COMPANY, in its Imperial Carbon Arc Headlights—types A, B, C, D, H, J, K, L, P, Q and V—illustrated, described and listed on pages 26 to 38, inclusive, offers the highest development of the carbon arc headlight, for use on electrically operated traction lines. In types A, B, C, D and P headlights, the carbons are at an angle of 45 degrees. In types H, J, K, L, Q and V headlights, the carbons are vertical.

Every detail of these headlights has been carefully worked out to secure maximum efficiency with the least possible number of parts, and a minimum of weight consistent with service requirements.

These headlights are especially designed for interurban service. Some types are provided with one, and others, with two incandescent lamps, for use when the car comes within the limits of a town having an ordinance against undimmed carbon arc headlights. Still other types have the carbon equipment alone, and with these dimmers can be used when a decrease in the illumination is necessary.

If the switch operating the combined arc and incandescent types is conveniently located, the motorman can change the light from arc to incandescent, or vice versa, without reducing the speed of the car or leaving his position at the controller. The combination arc and incandescent types, in addition to meeting ordinance requirements, are used effectively by changing from arc to incandescent circuit, when cars are approaching each other, or when the intense light interferes with approaching vehicles.

These headlights burn on any resistance not over five amperes capacity, and can be arranged to burn in series with the lamps in the car, if there are a sufficient number of lamp circuits. This latter arrangement makes unnecessary the main resistance regularly furnished with a complete equipment.

All the above headlights, except type V, have cases made of heavy, galvanized iron, ribbed and corrugated. Type V is furnished with a cast-iron case. The door frame also is of cast iron and provided with grids to protect the double thick glass in door. All cases are finished with high grade, weather-proof, black enamel.

Type V headlight was designed to give more illumination than the ordinary incandescent headlights, but not as much as the larger carbon arc types, and is intended for use where city trolley lines extend into the suburbs, passing through poorly lighted streets. The headlight gives sufficient light to illuminate a considerable distance ahead of the car, without too much glare for regular city service. The mechanism is simple, and easily inspected and repaired.

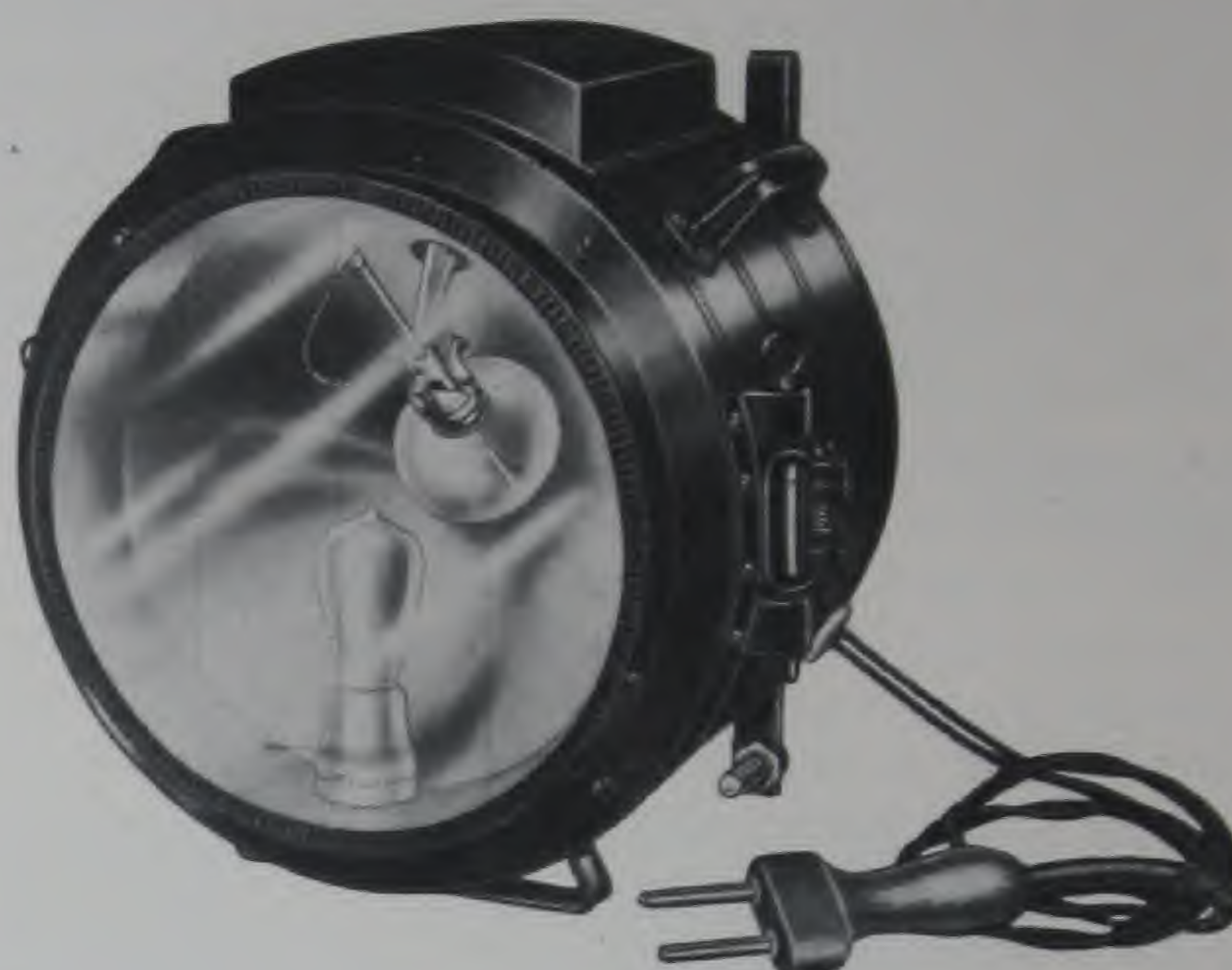
The reflectors regularly furnished with above headlights are paraboloidal and are spun from heavy sheet aluminum, highly polished.

To obtain the best results, the length of arc in above headlight should be from $\frac{3}{16}$ to $\frac{1}{4}$ of an inch in length.

Imperial Carbon Arc Headlight for Electric Traction Service

Type A—Combination Arc and Incandescent

Carbons at 45-Degree Angle—12-Inch Paraboloidal Aluminum Reflector



For 4 Amperes, 575 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Plug and Cable	17840	60 lbs.	\$33.70
Headlight with Single End Equipment	17837	95 lbs.	48.90
Headlight with Double End Equipment	17836	100 lbs.	52.20

List prices for above headlight arranged for voltages other than standard, on application.

Above list prices include four sets of carbons, two clear inner globes and a trimming gauge.

The incandescent circuit of above headlight is arranged for one 56-watt, 115-volt, Mazda lamp, and this arrangement will always be furnished, unless otherwise specified on order. If specified on the order, this headlight will be arranged for any Edison base incandescent lamp from 23 to 94 watts, 115 volts, without extra charge.

If specifically ordered, the above headlight will be arranged for complete metallic circuit, obviating the grounding of the headlight on the dash, at an increase in list price of \$3.80 for double end equipment; \$2.95 for single end equipment, and \$2.10 for headlight only.

If specified on the order, the above headlight will be furnished with a nickel-plated copper reflector, without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" front glass, at an advance of \$5.10 in list price.

Shipping dimensions of complete equipment, 34 x 21 x 19 inches.

Above list prices do not include incandescent lamp.

Wiring diagram, page 76, diagram No. 1.

Dimensional diagram, page 80, diagram No. 5.

Wiring equipments included in above listings are listed separately on page 66.

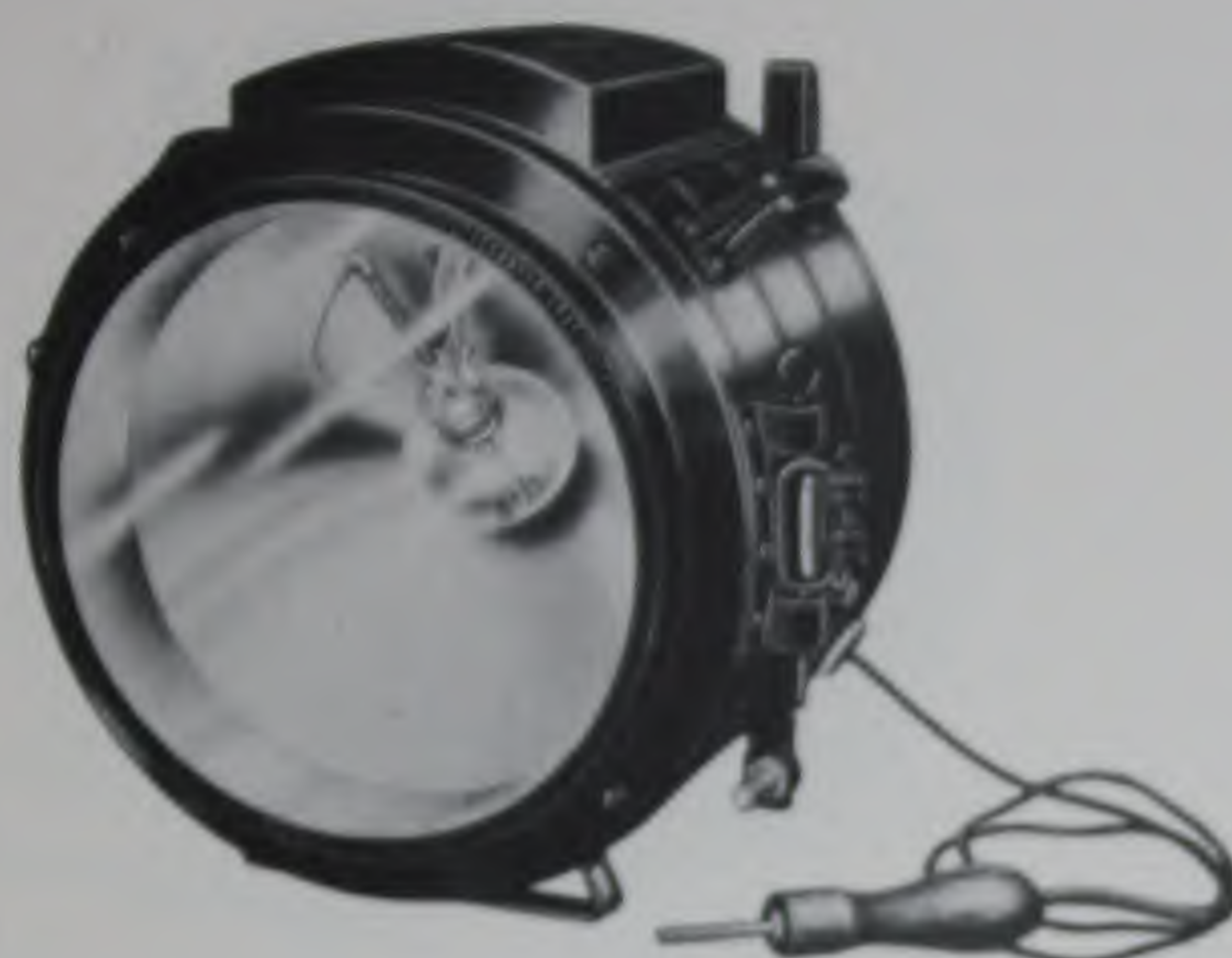
Assembled and detail parts, pages 98 to 105, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Carbon Arc Headlight for Electric Traction Service

Type B—Arc Only

Carbons at 45-Degree Angle—12-Inch Paraboloidal Aluminum Reflector



For 4 Amperes, 575 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price - Each
Headlight with Plug and Cable	17845	55 lbs.	\$26.30
Headlight with Single End Equipment	17842	90 lbs.	39.90
Headlight with Double End Equipment	17841	95 lbs.	41.55

List prices for above headlight arranged for voltages other than standard, on application.

Above list prices include four sets of carbons, two clear inner globes and a trimming gauge.

If specified on the order, above headlight will be furnished with a metal screen dimmer (Cat. No. HL2190, page 104), at an increase of \$2.40 in the above list prices. The metal screen dimmer is fastened to the headlight by means of an adjustable band, which fits around the projection of the door.

If specifically ordered, the above headlight will be arranged for complete metallic circuit, obviating the grounding of the headlight on the dash, at an increase in list price of \$3.80 for double end equipment; \$2.95 for single end equipment, and \$2.10 for headlight only.

If specified on the order, the above headlight will be furnished with a nickel-plated copper reflector, without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" front glass, at an advance of \$5.10 in list price.

Shipping dimensions of complete equipment, 34 x 21 x 19 inches.

Wiring diagram, page 76, diagram No. 2.

Dimensional diagram, page 80, diagram No. 5.

Wiring equipments included in above listings are listed separately on page 66.

Assembled and detail parts, pages 98 to 105, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Carbon Arc Headlight for Electric Traction Service

Type C—Combination Arc and Incandescent

9-Inch Paraboloidal Aluminum Reflector and 6-Inch Extension
Carbons at 45-Degree Angle



For 4 Amperes, 575 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Plug and Cable	17850	60 lbs.	\$33.70
Headlight with Single End Equipment	17847	95 lbs.	48.90
Headlight with Double End Equipment	17846	100 lbs.	52.20

List prices for above headlight arranged for voltages other than standard, on application.

Above list prices include four sets of carbons, two clear inner globes and a trimming gauge.

The incandescent circuit of above headlight is arranged for one 56-watt, 115-volt, Mazda lamp, and this arrangement will always be furnished, unless otherwise specified on order. If specified on the order, this headlight will be arranged for any Edison base incandescent lamp from 23 to 94 watts, 115 volts, without extra charge.

If specifically ordered, the above headlight will be arranged for complete metallic circuit, obviating the grounding of the headlight on the dash, at an increase in list price of \$3.80 for double end equipment; \$2.95 for single end equipment, and \$2.10 for headlight only.

If specified on the order, the above headlight will be furnished with a nickel-plated copper reflector, without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" front glass, at an advance of \$4.00 in list price.

Shipping dimensions of complete equipment, 34 x 21 x 19 inches.

Above list prices do not include incandescent lamp.

Wiring diagram, page 76, diagram No. 1.

Dimensional diagram, page 80, diagram No. 6.

Wiring equipments included in above listings are listed separately on page 66.

Assembled and detail parts, pages 98 to 105, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Carbon Arc Headlight for Electric Traction Service

Type D—Arc Only

9-Inch Paraboloidal Aluminum Reflector and 6-Inch Extension
Carbons at 45-Degree Angle



For 4 Amperes, 575 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Plug and Cable	17855	55 lbs.	\$26.30
Headlight with Single End Equipment	17852	90 lbs.	39.90
Headlight with Double End Equipment	17851	95 lbs.	41.55

List prices for above headlight arranged for voltages other than standard, on application.

Above list prices include four sets of carbons, two clear inner globes and a trimming gauge.

If specified on the order, above headlight will be furnished with a metal screen dimmer (Cat. No. HL2167, page 104), at an increase of \$2.40 in the above list prices. The metal screen dimmer is fastened to the headlight by means of an adjustable band, which fits around the projection of the door.

If specifically ordered, the above headlight will be arranged for complete metallic circuit, obviating the grounding of the headlight on the dash, at an increase in list price of \$3.80 for double end equipment; \$2.95 for single end equipment, and \$2.10 for headlight only.

If specified on the order, the above headlight will be furnished with a nickel-plated copper reflector, without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" front glass, at an advance of \$4.00 in list price.

Shipping dimensions of complete equipment, 34 x 21 x 19 inches.

Wiring diagram, page 76, diagram No. 2.

Dimensional diagram, page 80, diagram No. 6.

Wiring equipments included in above listings are listed separately on page 66.

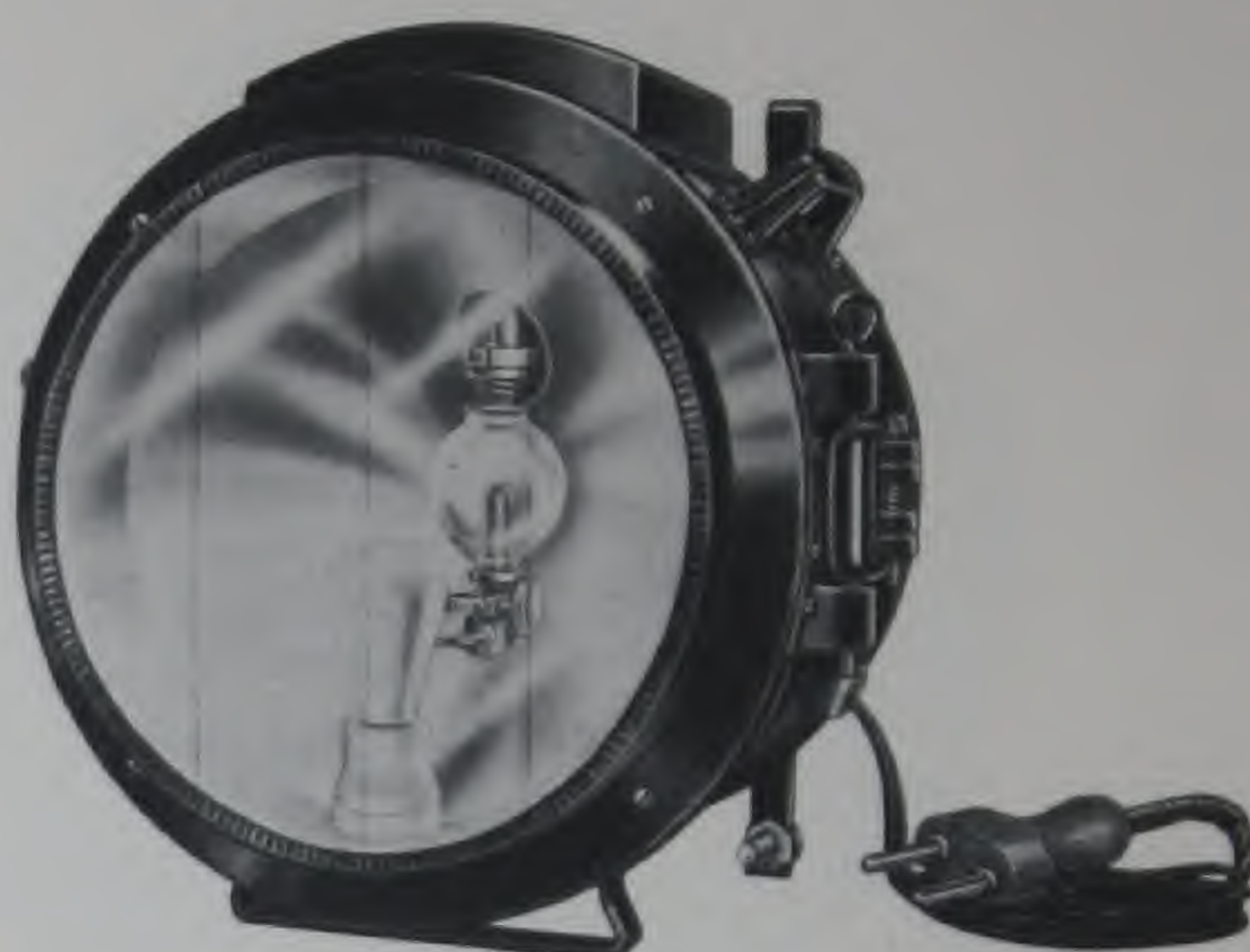
Assembled and detail parts, pages 98 to 105, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Carbon Arc Headlight for Electric Traction Service

Type H—Combination Arc and Incandescent

Vertical Carbons—12-Inch Paraboloidal Aluminum Reflector



For 4 Amperes, 575 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Plug and Cable	23943	60 lbs.	\$31.60
Headlight with Single End Equipment	23940	95 lbs.	46.80
Headlight with Double End Equipment	23939	100 lbs.	50.10

List prices for above headlight arranged for voltages other than standard, on application. Above list prices include four sets of carbons and two clear inner globes.

The incandescent circuit of above headlight is arranged for one 56-watt, 115-volt, Mazda lamp, and this arrangement will always be furnished, unless otherwise specified on order. If specified on the order, this headlight will be arranged for any Edison base incandescent lamp from 23 to 94 watts, 115 volts, without extra charge.

If specifically ordered, the above headlight will be arranged for complete metallic circuit, obviating the grounding of the headlight on the dash, at an increase in list price of \$3.80 for double end equipment; \$2.95 for single end equipment, and \$2.10 for headlight only.

If specified on the order, the above headlight will be furnished with a nickel-plated copper reflector, without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" front glass, at an advance of \$5.10 in list price.

Shipping dimensions of complete equipment, 34 x 21 x 19 inches.

Above list prices do not include incandescent lamp.

Wiring diagram, page 76, diagram No. 1.

Dimensional diagram, page 80, diagram No. 5.

Wiring equipments included in above listings are listed separately on page 66.

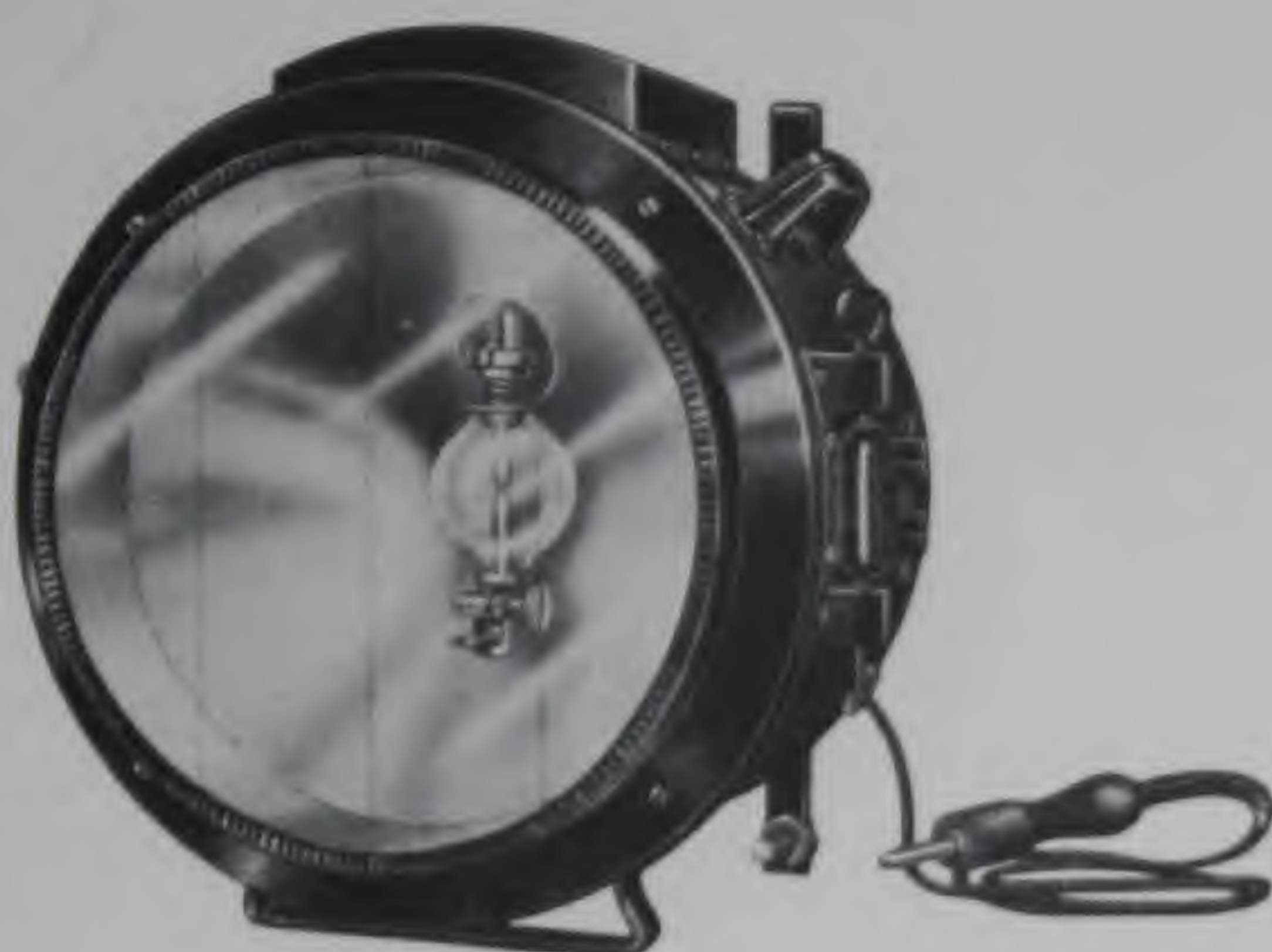
Assembled and detail parts, pages 98 to 105, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Carbon Arc Headlight for Electric Traction Service

Type J—Arc Only

Vertical Carbons—12-Inch Paraboloidal Aluminum Reflector



For 4 Amperes, 575 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Plug and Cable	23952	55 lbs.	\$23.45
Headlight with Single End Equipment	23949	90 lbs.	37.00
Headlight with Double End Equipment	23948	95 lbs.	38.65

List prices for above headlight arranged for voltages other than standard, on application. Above list prices include four sets of carbons and two clear inner globes.

If specified on the order, above headlight will be furnished with a metal screen dimmer (Cat. No. HL2190, page 104), at an increase of \$2.40 in the above list prices. The metal screen dimmer is fastened to the headlight by means of an adjustable band, which fits around the projection of the door.

If specifically ordered, the above headlight will be arranged for complete metallic circuit, obviating the grounding of the headlight on the dash, at an increase in list price of \$3.80 for double end equipment; \$2.95 for single end equipment, and \$2.10 for headlight only.

If specified on the order, the above headlight will be furnished with a nickel-plated copper reflector, without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" front glass, at an advance of \$5.10 in list price.

Shipping dimensions of complete equipment, 34 x 21 x 19 inches.

Wiring diagram, page 76, diagram No. 2.

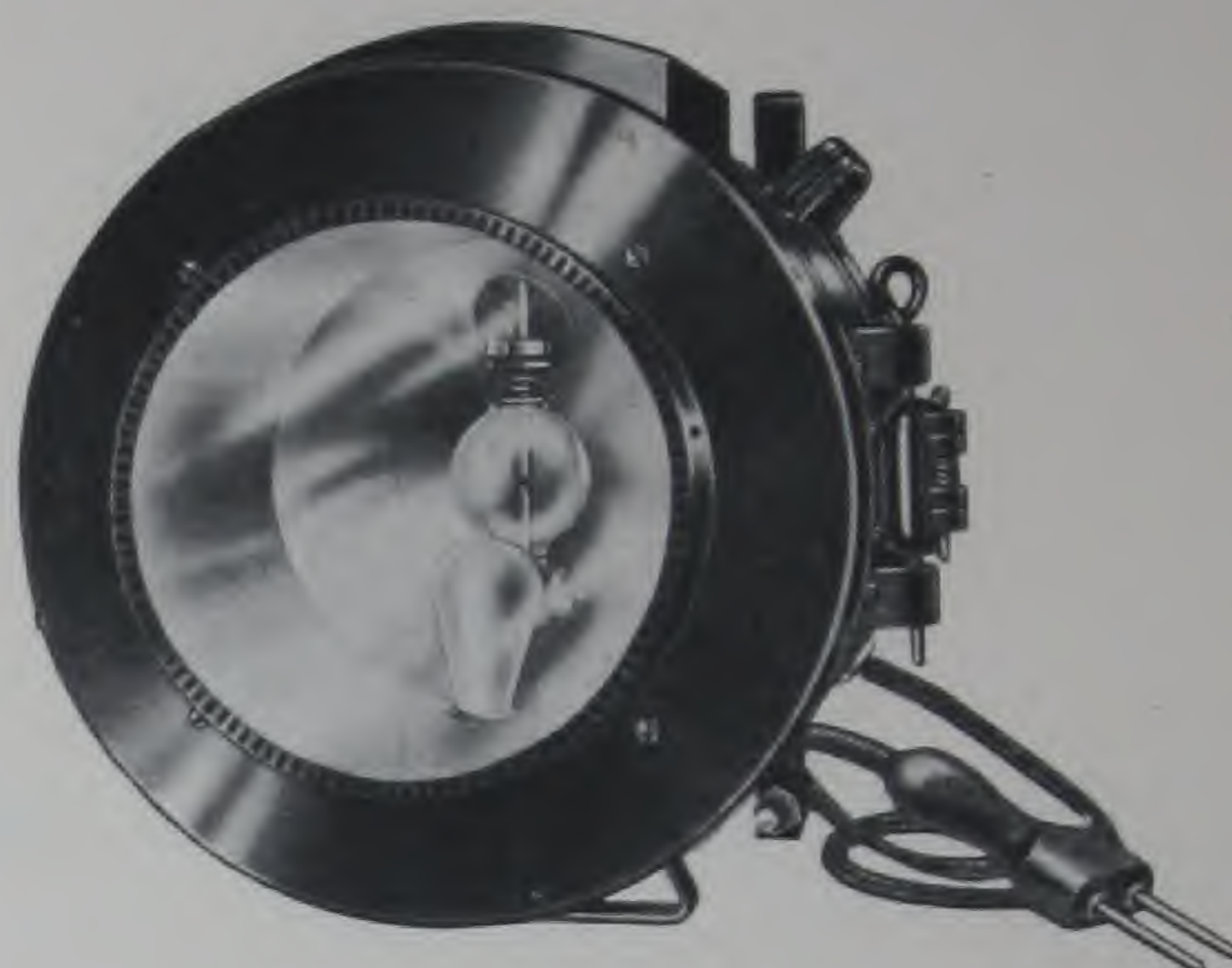
Dimensional diagram, page 80, diagram No. 5.

Wiring equipments included in above listings are listed separately on page 66.

Assembled and detail parts, pages 98 to 105, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Carbon Arc Headlight for Electric Traction Service
Type K—Combination Arc and Incandescent
 Vertical Carbons—9-Inch Paraboloidal Aluminum Reflector and 6-Inch Extension



For 4 Amperes, 575 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Plug and Cable	23961	60 lbs.	\$31.60
Headlight with Single End Equipment	23958	95 lbs.	46.80
Headlight with Double End Equipment	23957	100 lbs.	50.10

List prices for above headlight arranged for voltages other than standard, on application.
 Above list prices include four sets of carbons and two clear inner globes.

The incandescent circuit of above headlight is arranged for one 56-watt, 115-volt, Mazda lamp, and this arrangement will always be furnished, unless otherwise specified on order. If specified on the order, this headlight will be arranged for any Edison base incandescent lamp from 23 to 94 watts, 115 volts, without extra charge.

If specifically ordered, the above headlight will be arranged for complete metallic circuit, obviating the grounding of the headlight on the dash, at an increase in list price of \$3.80 for double end equipment; \$2.95 for single end equipment, and \$2.10 for headlight only.

If specified on the order, the above headlight will be furnished with a nickel-plated copper reflector, without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" front glass, at an advance of \$4.00 in list price.

Shipping dimensions of complete equipment, 34 x 21 x 19 inches.

Above list prices do not include incandescent lamp.

Wiring diagram, page 76, diagram No. 1.

Dimensional diagram, page 80, diagram No. 6.

Wiring equipments included in above listings are listed separately on page 66.

Assembled and detail parts, pages 98 to 105, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Carbon Arc Headlight for Electric Traction Service

Type L—Arc Only

Vertical Carbons—9-Inch Paraboloidal Aluminum Reflector and 6-Inch Extension



For 4 Amperes, 575 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Plug and Cable	23970	55 lbs.	\$23.45
Headlight with Single End Equipment	23967	90 lbs.	37.00
Headlight with Double End Equipment	23966	95 lbs.	38.65

List prices for above headlight arranged for voltages other than standard, on application.

Above list prices include four sets of carbons and two clear inner globes.

If specified on the order, above headlight will be furnished with a metal screen dimmer (Cat. No. HL2167, page 104), at an increase of \$2.40 in the above list prices. The metal screen dimmer is fastened to the headlight by means of an adjustable band, which fits around the projection of the door.

If specifically ordered, the above headlight will be arranged for complete metallic circuit, obviating the grounding of the headlight on the dash, at an increase in list price of \$3.80 for double end equipment; \$2.95 for single end equipment, and \$2.10 for headlight only.

If specified on the order, the above headlight will be furnished with a nickel-plated copper reflector, without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" front glass, at an advance of \$4.00 in list price.

Shipping dimensions of complete equipment, 34 x 21 x 19 inches.

Wiring diagram, page 76, diagram No. 2.

Dimensional diagram, page 80, diagram No. 6.

Wiring equipments included in above listings are listed separately on page 66.

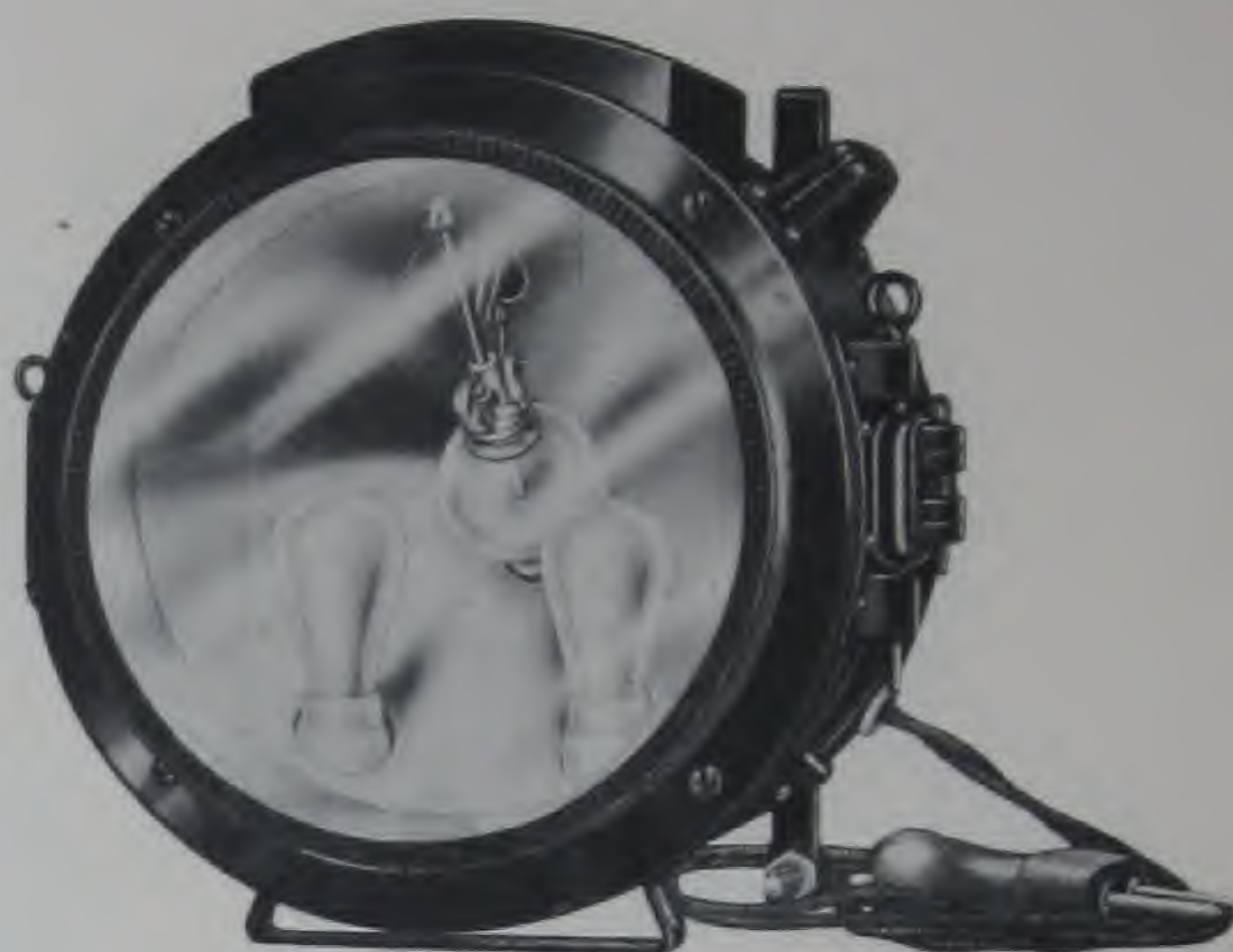
Assembled and detail parts, pages 98 to 105, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Carbon Arc Headlight for Electric Traction Service

Type P—Combination Arc and Incandescent

Carbons at 45-Degree Angle—12-Inch Paraboloidal Aluminum Reflector



For 4 Amperes, 575 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Plug and Cable	24006	60 lbs.	\$34.75
Headlight with Single End Equipment	24003	95 lbs.	50.00
Headlight with Double End Equipment	24002	100 lbs.	53.30

List prices for above headlight arranged for voltages other than standard, on application.

Above list prices include four sets of carbons, two clear inner globes and a trimming gauge.

The incandescent circuit of above headlight is arranged for two 56-watt, 115-volt, Mazda lamps, and this arrangement will always be furnished, unless otherwise specified on order. If specified on the order, this headlight will be arranged for any Edison base incandescent lamp from 23 to 56 watts, 115 volts, without extra charge.

If specifically ordered, the above headlight will be arranged for complete metallic circuit, obviating the grounding of the headlight on the dash, at an increase in list price of \$3.80 for double end equipment; \$2.95 for single end equipment, and \$2.10 for headlight only.

If specified on the order, the above headlight will be furnished with a nickel-plated copper reflector, without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" front glass, at an advance of \$5.10 in list price.

Shipping dimensions of complete equipment, 34 x 21 x 19 inches.

Above list prices do not include incandescent lamp.

Wiring diagram, page 76, diagram No. 1.

Dimensional diagram, page 80, diagram No. 5.

Wiring equipments included in above listings are listed separately on page 66.

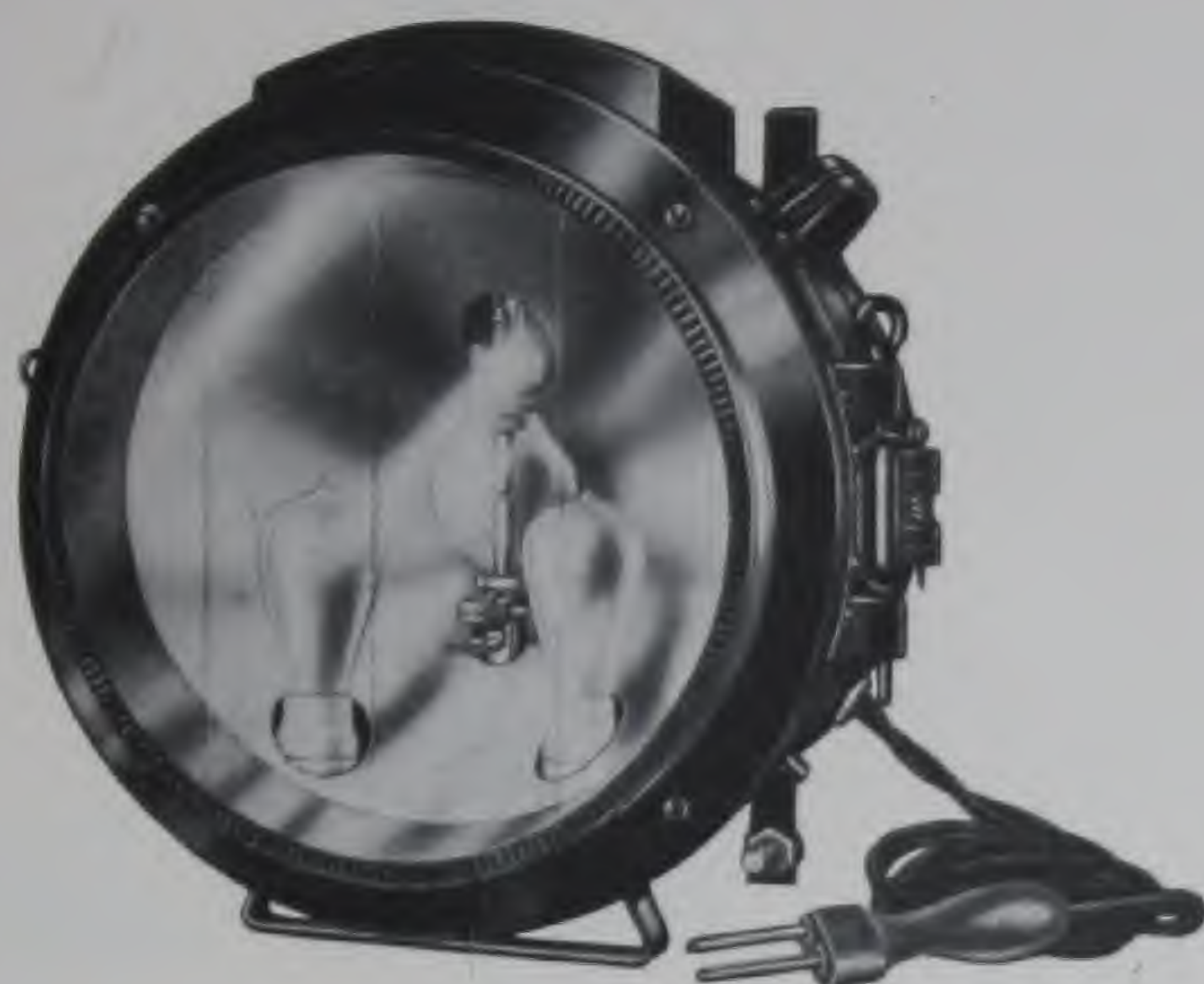
Assembled and detail parts, pages 98 to 105, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Carbon Arc Headlight for Electric Traction Service

Type Q—Combination Arc and Incandescent

Vertical Carbons—12-Inch Paraboloidal Aluminum Reflector



For 4 Amperes, 575 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Plug and Cable	24024	60 lbs.	\$32.65
Headlight with Single End Equipment	24021	95 lbs.	47.85
Headlight with Double End Equipment	24020	100 lbs.	51.20

List prices for above headlight arranged for voltages other than standard, on application.
Above list prices include four sets of carbons and two clear inner globes.

The incandescent circuit of above headlight is arranged for two 56-watt, 115-volt, Mazda lamps, and this arrangement will always be furnished, unless otherwise specified on order. If specified on the order, this headlight will be arranged for any Edison base incandescent lamp from 23 to 56 watts, 115 volts, without extra charge.

If specifically ordered, the above headlight will be arranged for complete metallic circuit, obviating the grounding of the headlight on the dash, at an increase in list price of \$3.80 for double end equipment; \$2.95 for single end equipment, and \$2.10 for headlight only.

If specified on the order, the above headlight will be furnished with a nickel-plated copper reflector, without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" front glass, at an advance of \$5.10 in list price.

Shipping dimensions of complete equipment, 34 x 21 x 19 inches.

Above list prices do not include incandescent lamp.

Wiring diagram, page 76, diagram No. 1.

Dimensional diagram, page 80, diagram No. 5.

Wiring equipments included in above listings are listed separately on page 66.

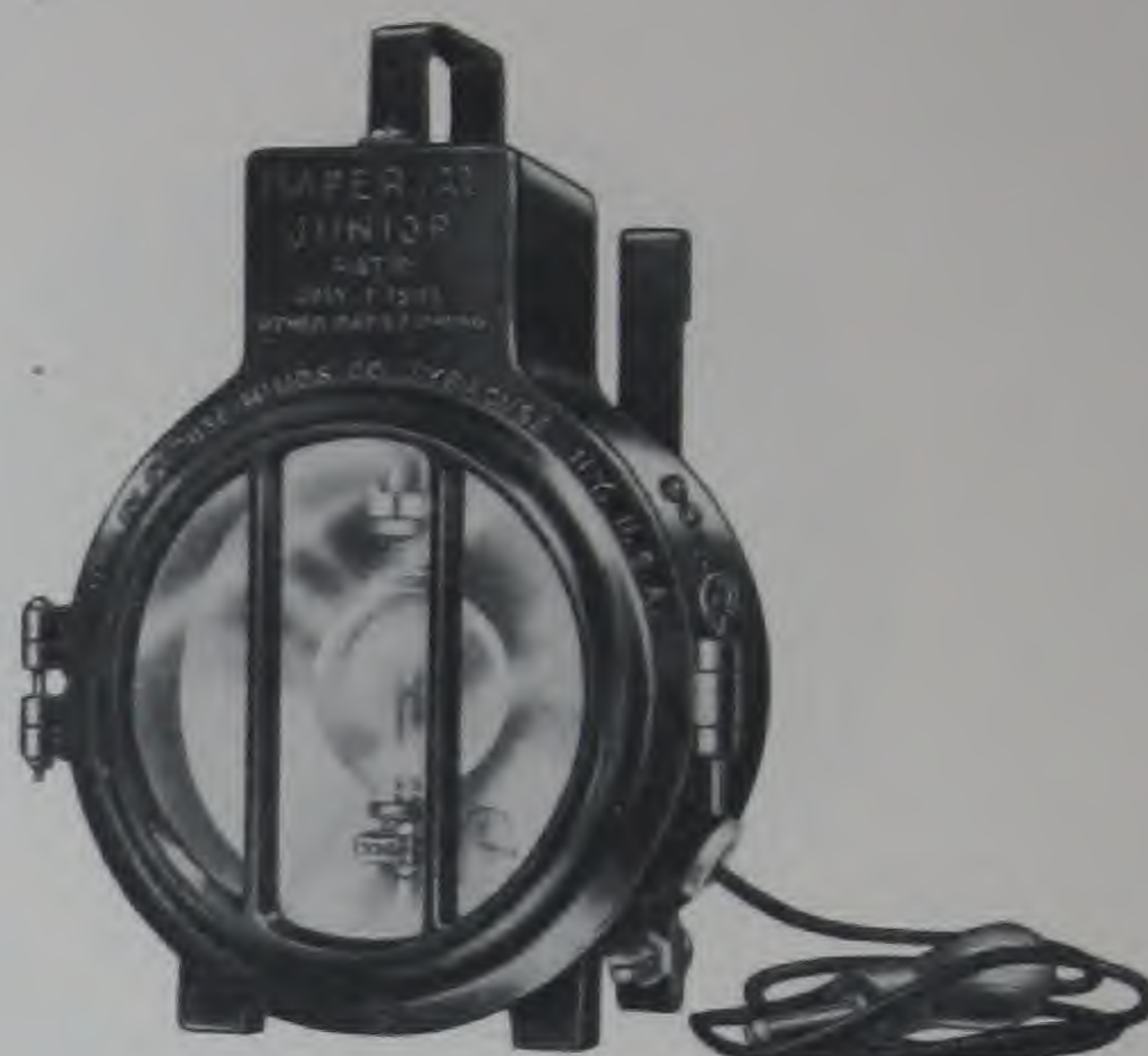
Assembled and detail parts, pages 98 to 105, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Carbon Arc Headlight for Electric Traction Service

Type V—Arc Only

Plain Glass in Grid Door—8-Inch Paraboloidal Aluminum Reflector



For 4 Amperes, 575 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Plug and Cable	28019	40 lbs.	\$16.85
Headlight with Single End Equipment	28020	70 lbs.	30.40
Headlight with Double End Equipment	28021	75 lbs.	32.05

For 2 Amperes, 575 Volts D. C., Grounded Circuit

Headlight with Plug and Cable	24082	40 lbs.	\$16.85
Headlight with Single End Equipment	24087	70 lbs.	30.40
Headlight with Double End Equipment	24088	75 lbs.	32.05

List prices for above headlight arranged for voltages other than standard, on application.

Above list prices include four sets of carbons and two clear inner globes.

If specifically ordered, the above headlight will be arranged for complete metallic circuit, obviating the grounding of the headlight on the dash, at an increase in list price of \$3.80 for double end equipment; \$2.95 for single end equipment, and \$2.10 for headlight only.

If specified on the order, the above headlight will be furnished with a nickel-plated copper reflector, without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" front glass, at an advance of \$3.30 in list price.

Shipping dimensions of complete equipment, 26 x 18 x 10 inches.

Wiring diagrams, page 76, diagram No. 2, and page 79, diagrams Nos. 3 and 4.

Dimensional diagram, page 81, diagram No. 5.

Wiring equipments included in above listings are listed separately on page 66.

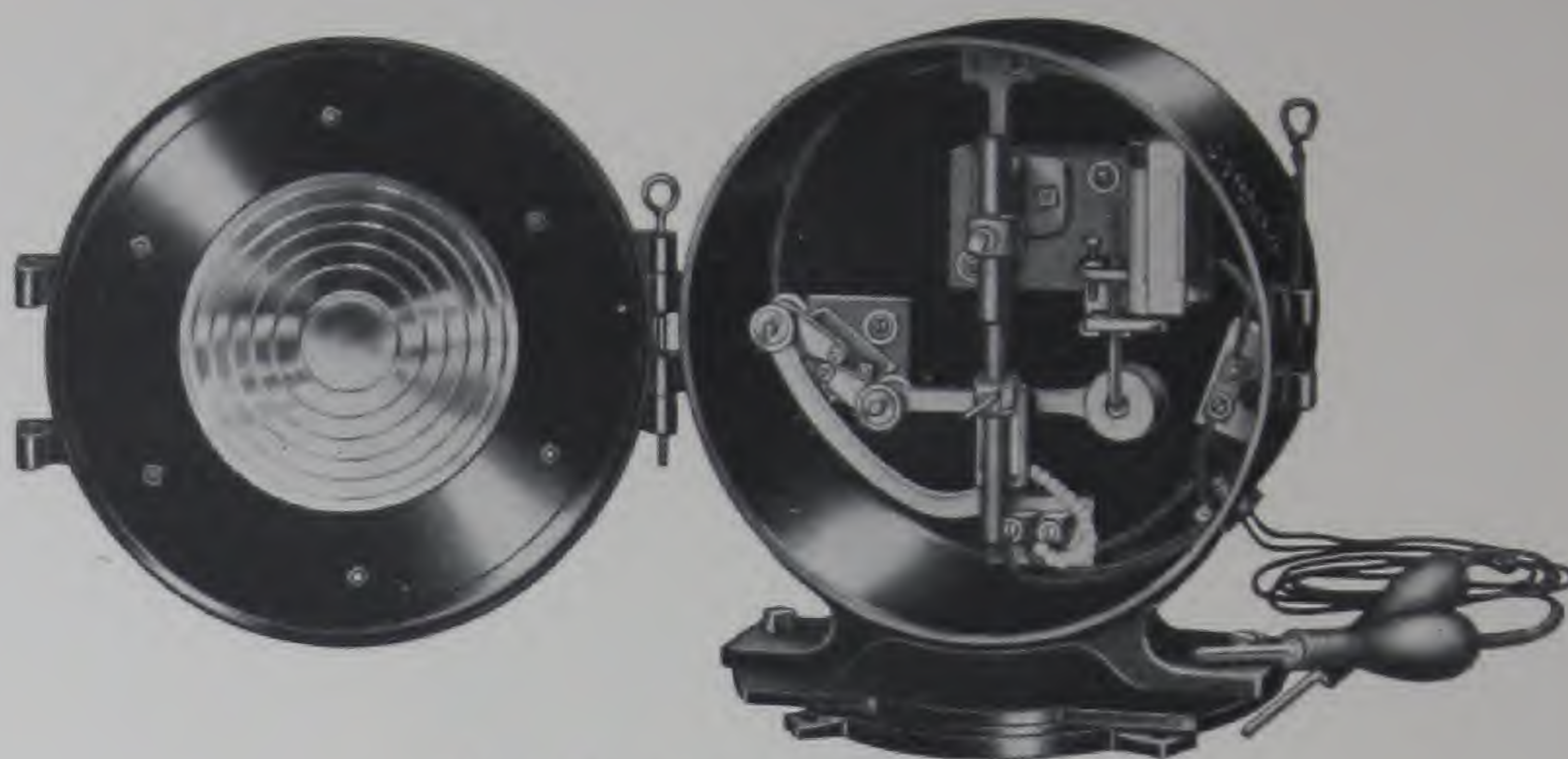
Assembled and detail parts, pages 106 to 109, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

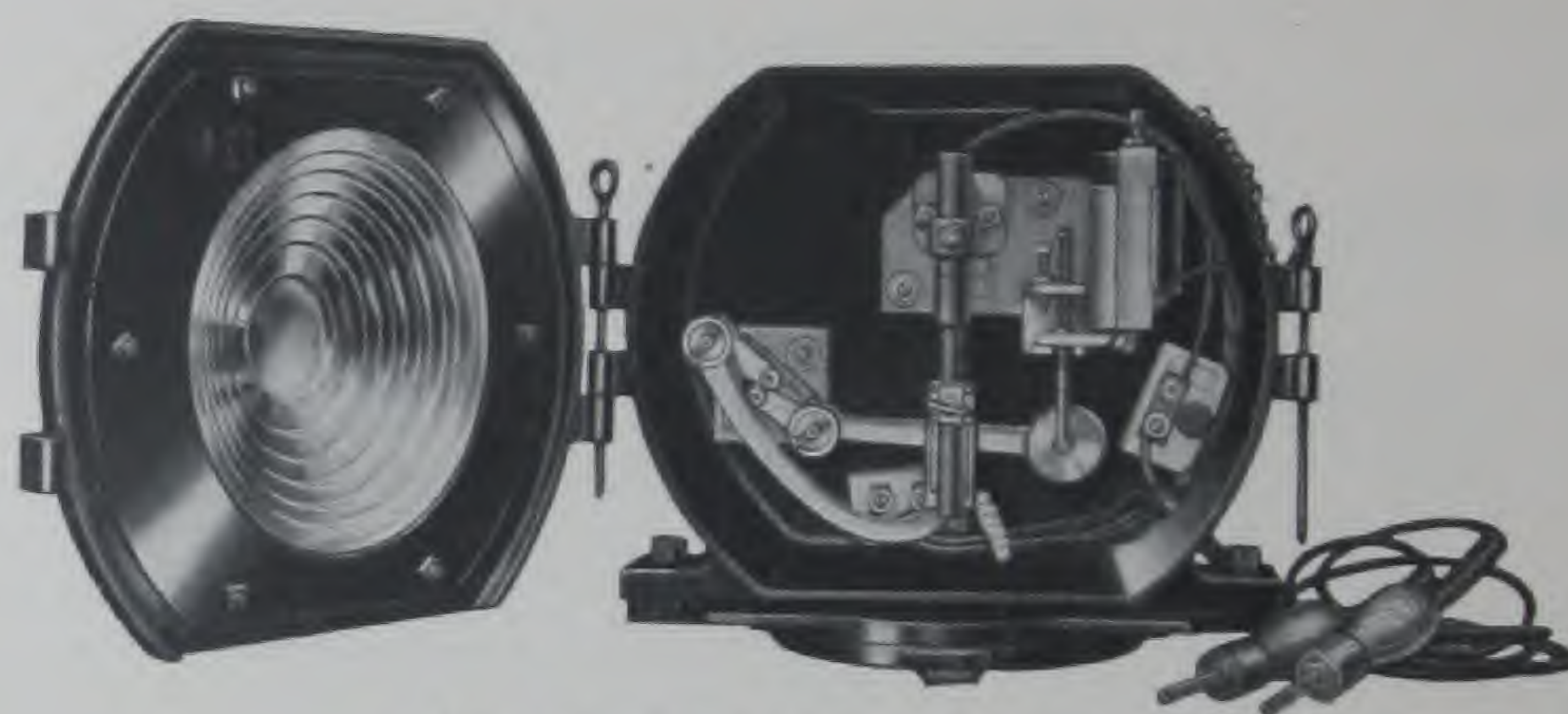
CROUSE-HINDS
IMPERIAL LUMINOUS ARC HEADLIGHTS
FOR ELECTRIC MINE LOCOMOTIVES

Types ML, MLF and MLD—Arc Only

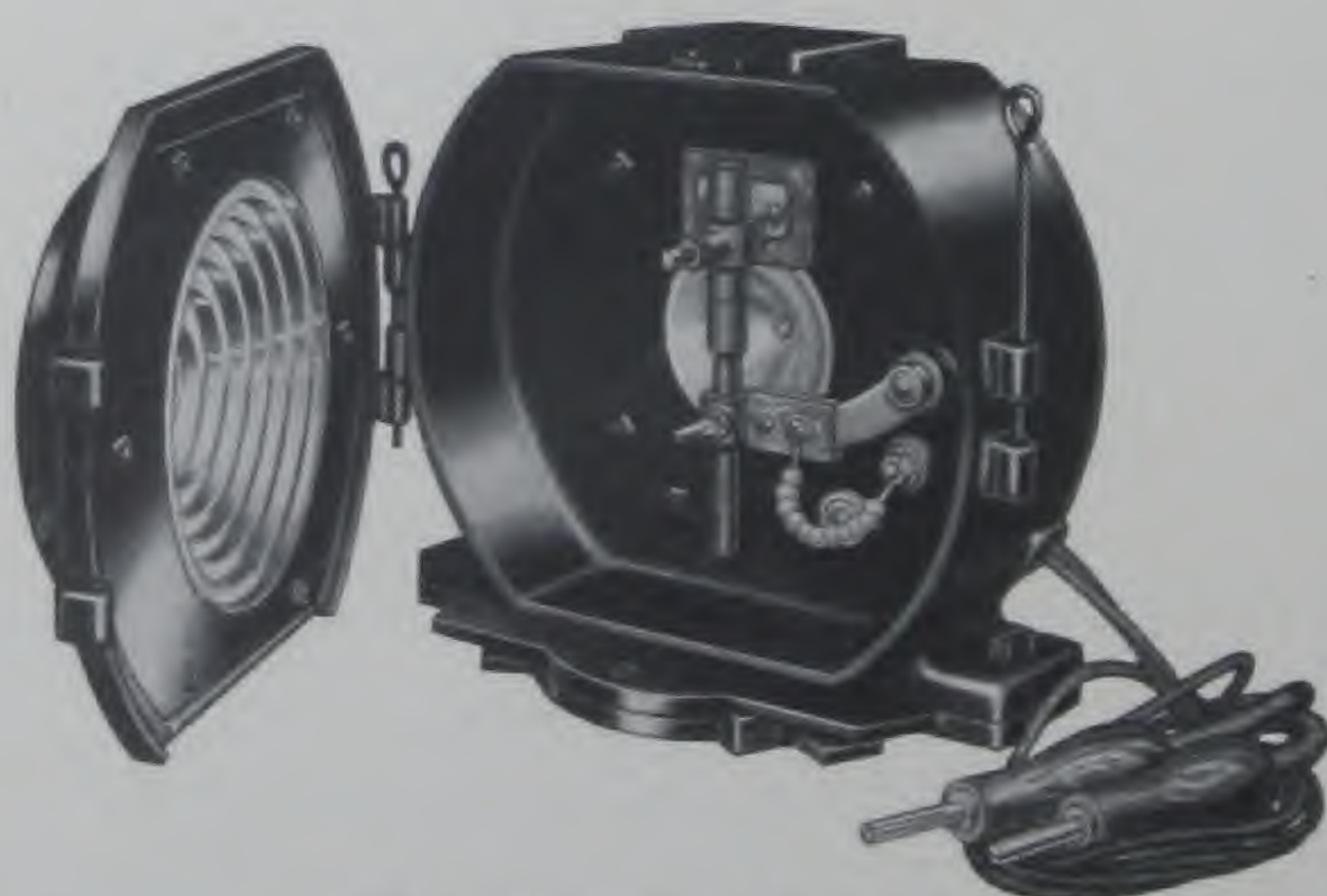
Imperial Luminous Arc Headlights for Electric Mine Locomotives



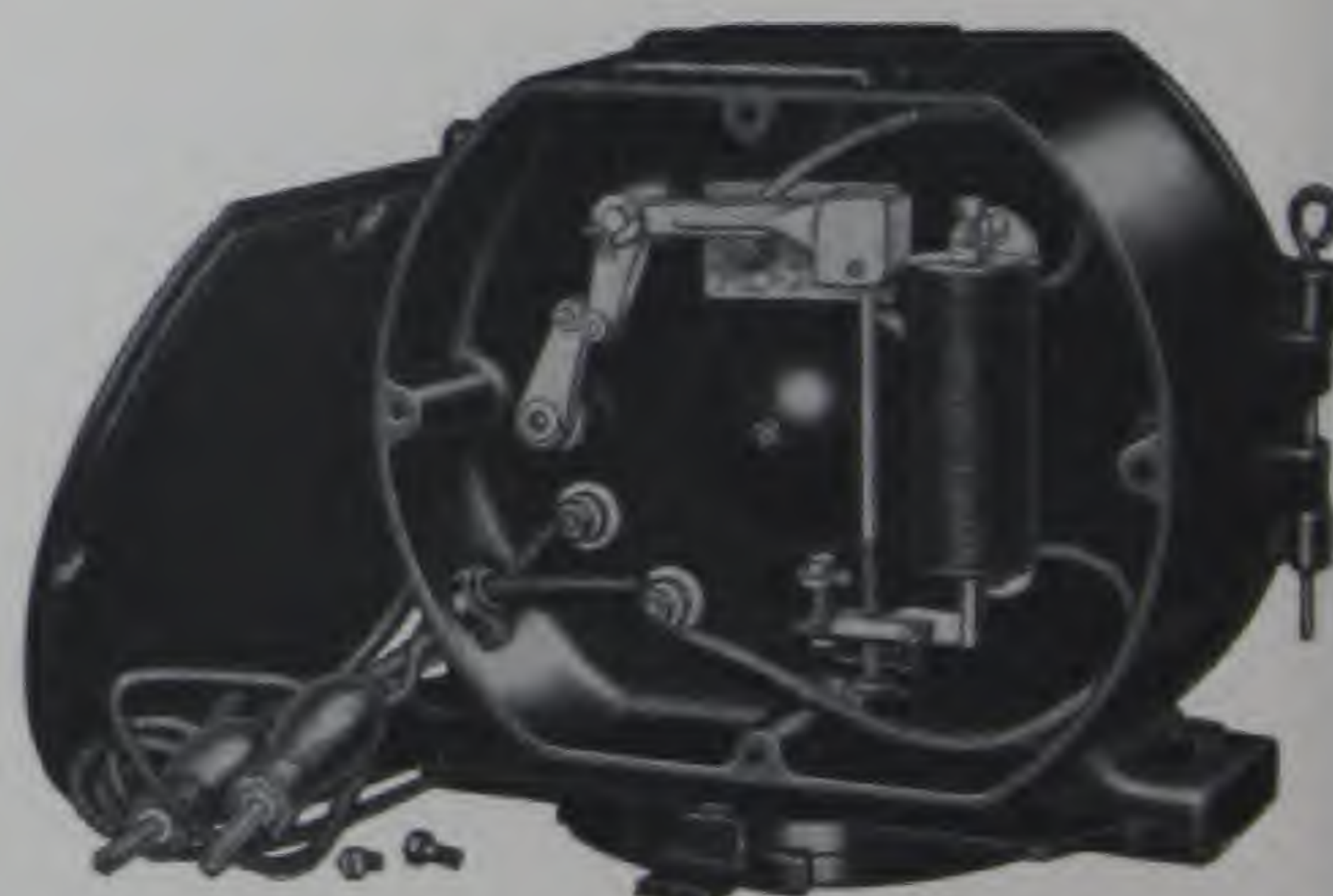
Type ML Headlight with Turret Base
(Front Door Open)



Type MLF Headlight with Turret Base
(Front Door Open)



Type MLD—Front Compartment



Type MLD—Rear Compartment

Imperial Luminous Arc Headlights for Electric Mine Locomotives

Types ML, MLF and MLD—Arc Only

Types ML, MLF and MLD headlights—listed on pages 42 to 47, inclusive, are especially made for use on mine locomotives where great strength is essential. These headlights are practically indestructible, as both case and door are heavy cast iron, finished with high grade, water-proof, black enamel. All three types have the same illuminating characteristics.

Types ML and MLF have single compartment cases and differ only in that the casing of type ML is somewhat larger. Type MLD has a two-compartment casing and all the latest improvements. The arc compartment of type MLD, in front, is hermetically sealed from the mechanism compartment, in the rear. Consequently, the fumes and deposits given off by the arc cannot collect on the mechanism parts. Access to the mechanism of the type MLD headlight is had through the rear door, which is held in place by cap screws.

The light of all three types of headlights is derived from especially constructed electrodes, and is far more uniform than can be secured by the use of carbons. These electrodes can go for days without renewal, as the upper one has a life of approximately 3000 hours, while the lower electrode for type ML will last for 125, as against 100 hours of actual service in types MLF and MLD. It is advisable, however, in order to secure best results, that the lower electrode be adjusted and the headlight be cleaned once a day. The shorter life of the lower electrode for types MLF and MLD headlights is due to the fact that a shorter electrode is made necessary because of the flat top case.

The length of arc in above headlights should be from $\frac{5}{16}$ to $\frac{3}{8}$ of an inch.

The long life and low cost of the electrodes and the additional fact that no inner globe is necessary with them, reduce the maintenance cost to a minimum.

An 8 $\frac{3}{8}$ -inch semaphore lens is used in the door of each type of headlight and is protected by a circular flange which is cast with the door frame and which extends slightly beyond the apex of the lens. The semaphore lens concentrates the light and projects a strong beam a sufficient distance to illuminate the entire runway of the mine.

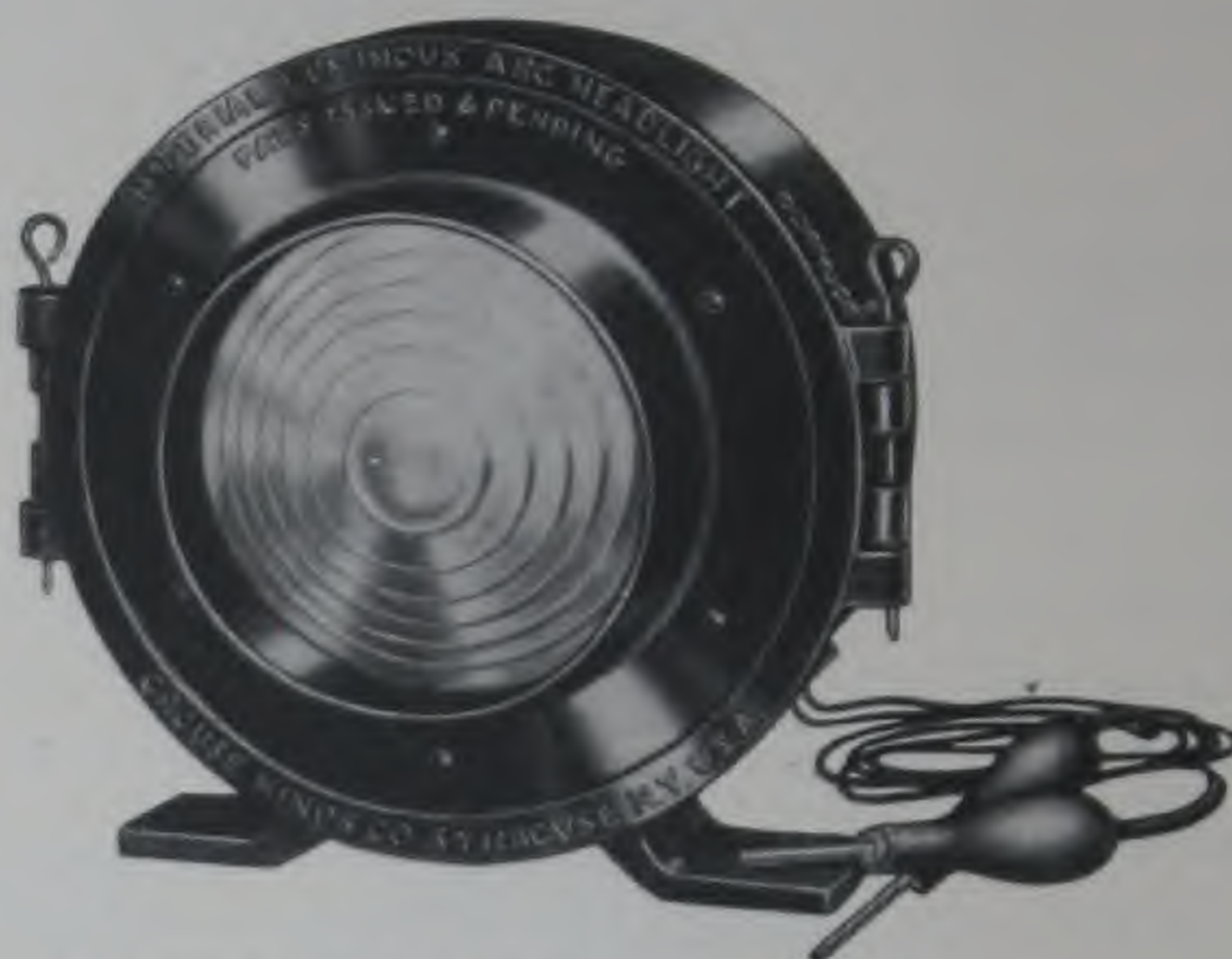
Types ML, MLF and MLD headlights are furnished in two styles. One is designed to be secured rigidly to the locomotive, and the other to be mounted on a turret base, allowing the headlight to be revolved through 180 degrees and lock in position. When mounted on a turret base, only one headlight is required to a locomotive and, furthermore, the beam of light may be thrown up into the entry to facilitate loading.

Some operating departments prefer a headlight which gives a yellow beam of light, and to this end types ML, MLF and MLD headlights may be equipped with "Noglare" semaphore lenses. These "Noglare" lenses produce a beam of light tinged with yellow due to the absorption of rays at the blue end of the spectrum.

Imperial Luminous Arc Headlight for Electric Mine Locomotives

Type ML—Arc Only

Stationary Base—8³/₈-Inch Optical Semaphore Lens in Door



Type ML Headlight with Stationary Base

For 4 Amperes, 250 Volts D. C., Metallic Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Two Plugs and Cable	28000MC	60 lbs.	\$ 50.60
Headlight with Single End Equipment	28001MC	90 lbs.	67.55
Headlights (Two) with Double End Equipment	28002MC	140 lbs.	119.85

For 4 Amperes, 550 Volts D. C., Metallic Circuit

Headlight with Two Plugs and Cable	24701MC	60 lbs.	\$ 50.60
Headlight with Single End Equipment	24704MC	95 lbs.	70.90
Headlights (Two) with Double End Equipment	24724MC	145 lbs.	123.20

List prices for above headlight arranged for voltages other than standard, on application.
Above list prices include one upper and one lower electrode.

If specified on the order, the above headlight will be furnished with "Noglare" semaphore lens, at an advance of \$3.30 in list price.

Shipping dimensions of headlight with single end equipment, 31 x 19¹/₂ x 12 inches; shipping dimensions of headlight with double end equipment, 48 x 19¹/₂ x 12 inches.

Wiring diagrams, page 79, diagrams Nos. 1 and 2.

Dimensional diagram page 81, diagram No. 2.

Wiring equipments included in above listings are listed separately on page 66.

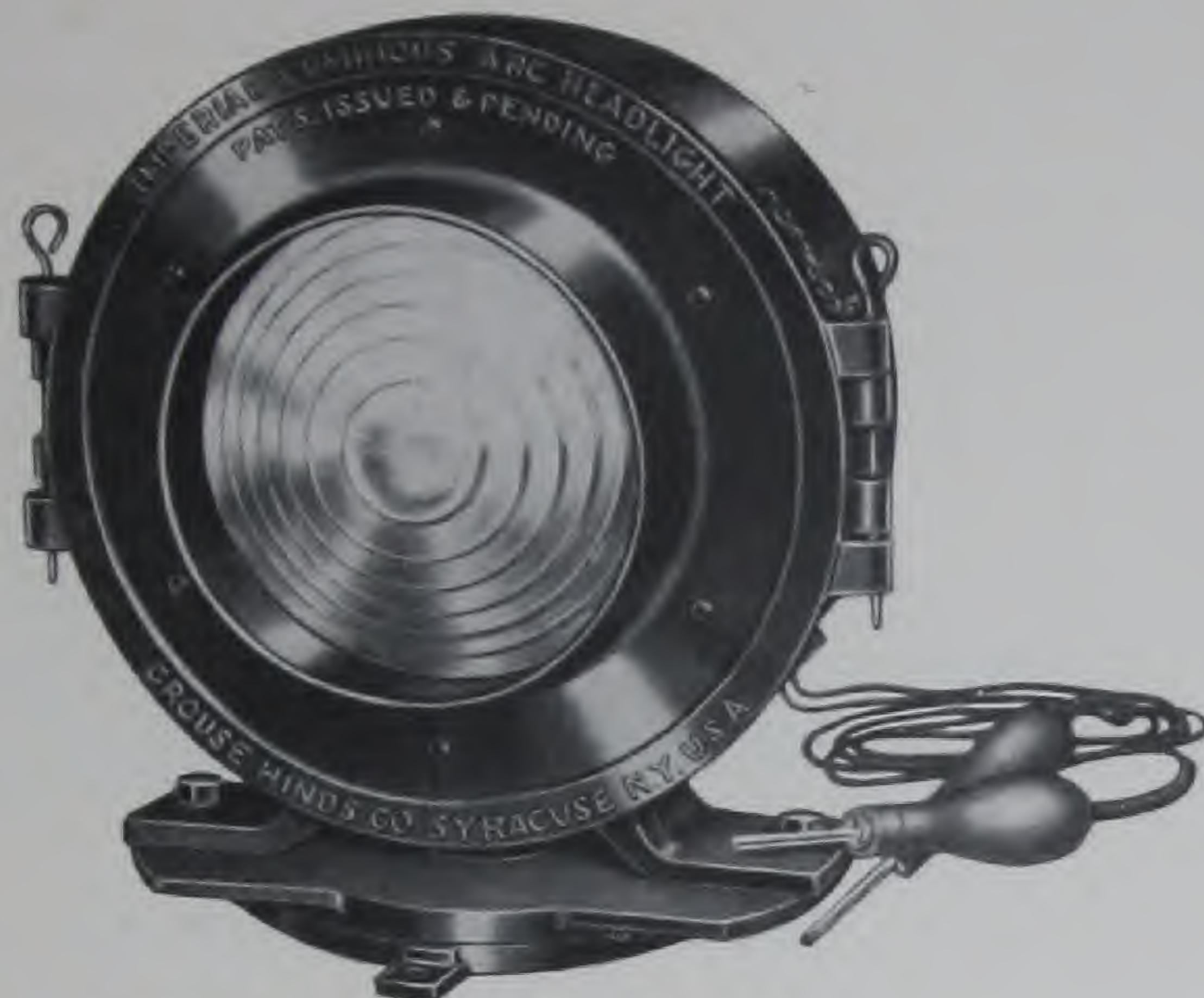
Assembled and detail parts, pages 93 to 96, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Luminous Arc Headlight for Electric Mine Locomotives

Type ML—Arc Only—Continued

Turret Base—8³/₈-Inch Optical Semaphore Lens in Door



Type ML Headlight with Turret Base

For 4 Amperes, 250 Volts D. C., Metallic Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Two Plugs, Cable and Turret Base.	28003MC	75 lbs.	\$63.95
Headlight with Turret Base and Wiring Equipment	28004MC	100 lbs.	80.90

For 4 Amperes, 550 Volts D. C., Metallic Circuit

Headlight with Two Plugs, Cable and Turret Base.	24741MC	75 lbs.	\$63.95
Headlight with Turret Base and Wiring Equipment	24744MC	105 lbs.	84.25

List prices for above headlight arranged for voltages other than standard, on application. Above list prices include one upper and one lower electrode.

If specified on the order, the above headlight will be furnished with "Noglare" semaphore lens, at an advance of \$3.30 in list price.

Shipping dimensions of headlight with wiring equipment, 31 x 19½ x 12 inches.

Wiring diagram, page 79, diagram No. 1.

Dimensional diagrams page 81, diagram No. 2, and page 82, diagram No. 1.

Wiring equipments included in above listings are listed separately on page 66.

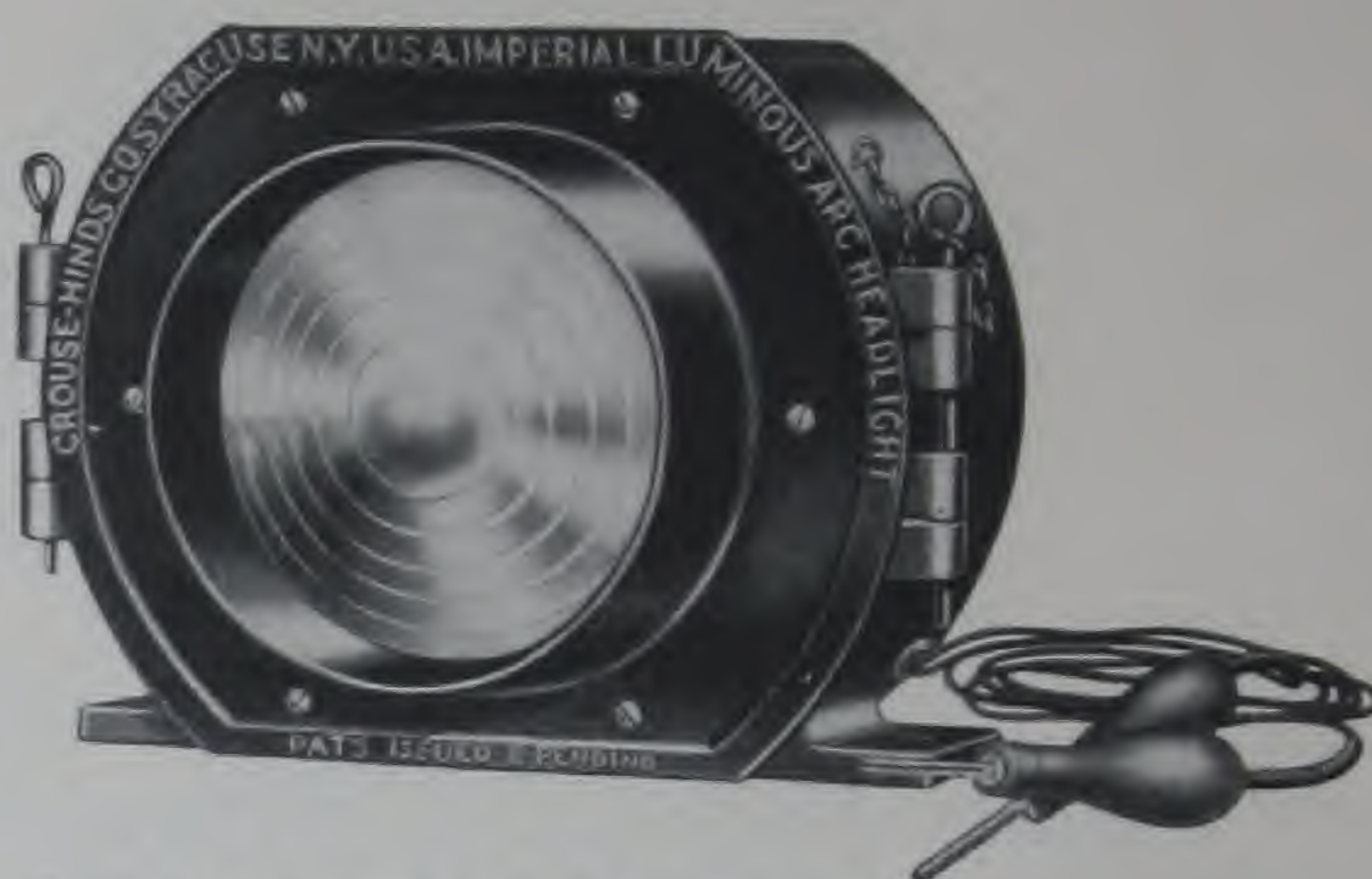
Assembled and detail parts, pages 93 to 96, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Luminous Arc Headlight for Electric Mine Locomotives

Type MLF—Arc Only

Stationary Base—8³/₈-Inch Optical Semaphore Lens in Door



Type MLF Headlight with Stationary Base

For 4 Amperes, 250 Volts D. C., Metallic Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Two Plugs and Cable	28005MC	60 lbs.	\$ 50.60
Headlight with Single End Equipment	28006MC	90 lbs.	67.55
Headlights (Two) with Double End Equipment	28007MC	140 lbs.	119.85

For 4 Amperes, 550 Volts D. C., Metallic Circuit

Headlight with Two Plugs and Cable	27001MC	60 lbs.	\$ 50.60
Headlight with Single End Equipment	27005MC	95 lbs.	70.90
Headlights (Two) with Double End Equipment	27025MC	145 lbs.	123.20

List prices for above headlight arranged for voltages other than standard, on application.
Above list prices include one upper and one lower electrode.

If specified on the order, the above headlight will be furnished with "Noglare" semaphore lens, at an advance of \$3.30 in list price.

Shipping dimensions of headlight with single end equipment, 31 x 19¹/₂ x 12 inches; shipping dimensions of headlight with double end equipment, 48 x 19¹/₂ x 12 inches.

Wiring diagrams, page 79, diagrams Nos. 1 and 2.

Dimensional diagram, page 81, diagram No. 3.

Wiring equipments included in above listings are listed separately on page 66.

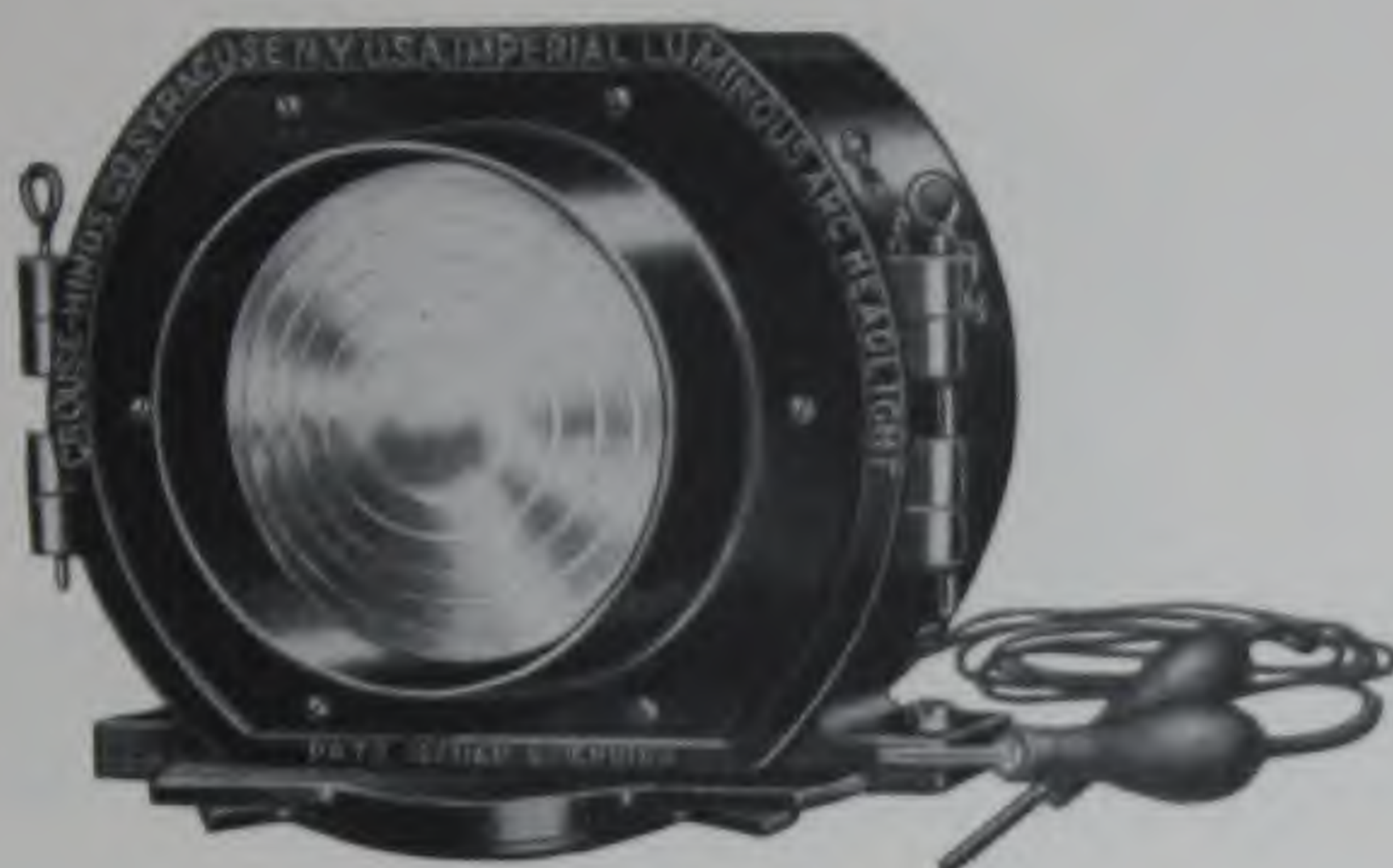
Assembled and detail parts, pages 93 to 96, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Luminous Arc Headlight for Electric Mine Locomotives

Type MLF—Arc Only—Continued

Turret Base—8³/₈-Inch Optical Semaphore Lens in Door



Type MLF Headlight with Turret Base

For 4 Amperes, 250 Volts D. C., Metallic Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Two Plugs, Cable and Turret Base.	28008MC	75 lbs.	\$63.95
Headlight with Turret Base and Wiring Equipment	28030MC	100 lbs.	80.90

For 4 Amperes, 550 Volts D. C., Metallic Circuit

Headlight with Two Plugs, Cable and Turret Base.	27041MC	75 lbs.	\$63.95
Headlight with Turret Base and Wiring Equipment	27045MC	105 lbs.	84.25

List prices for above headlight arranged for voltages other than standard, on application.
Above list prices include one upper and one lower electrode.

If specified on the order, the above headlight will be furnished with "Noglare" semaphore lens, at an advance of \$3.30 in list price.

Shipping dimensions of headlight with wiring equipment, 31 x 19¹/₂ x 12 inches.

Wiring diagram, page 79, diagram No. 1.

Dimensional diagrams, page 81, diagram No. 3, and page 82, diagram No. 2.

Wiring equipments included in above listings are listed separately on page 66.

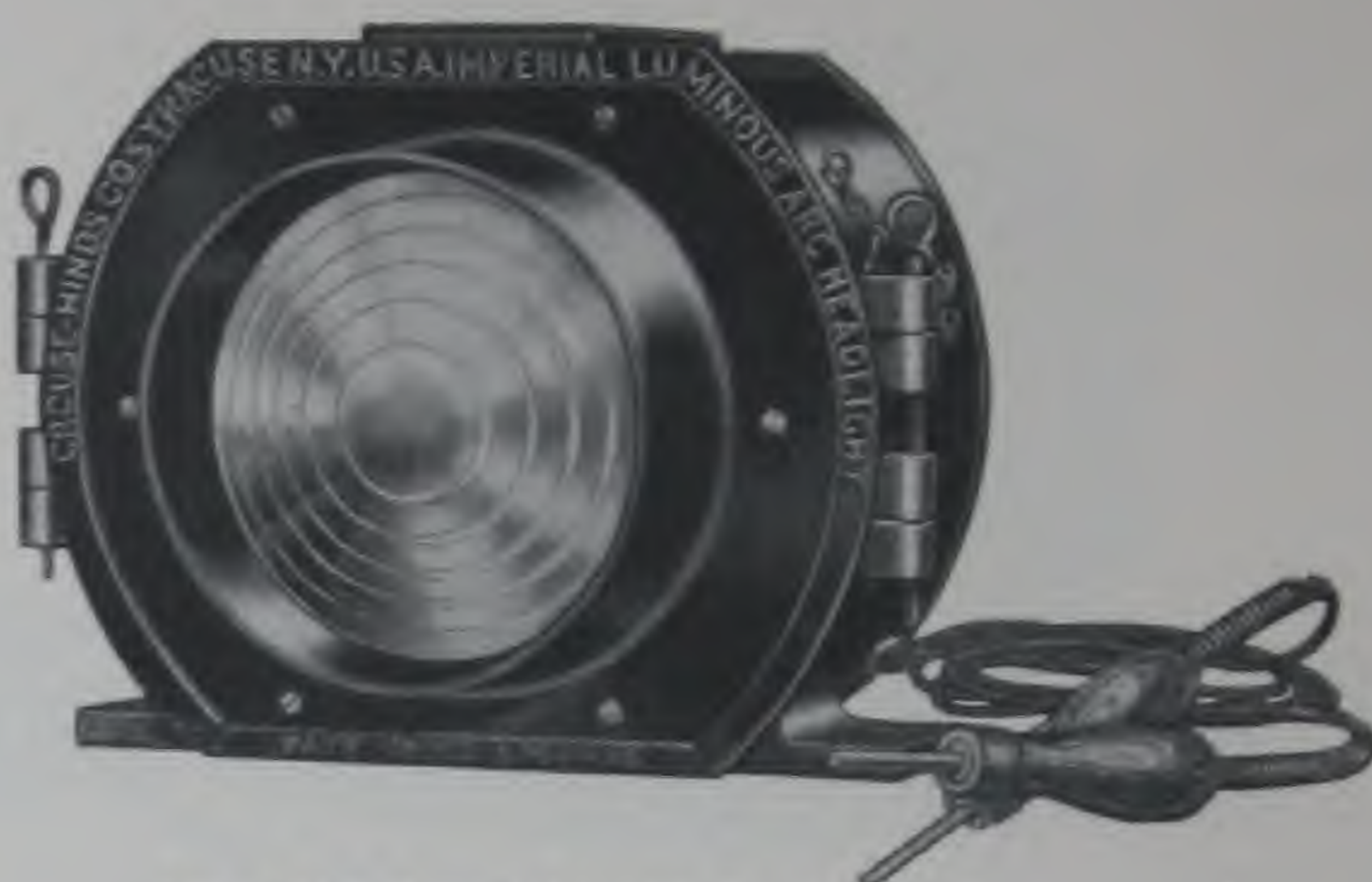
Assembled and detail parts, pages 93 to 96, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Luminous Arc Headlight for Electric Mine Locomotives

Type MLD—Arc Only

Stationary Base—8³/₈-Inch Optical Semaphore Lens in Door



Type MLD Headlight with Stationary Base

For 4 Amperes, 250 Volts D. C., Metallic Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Two Plugs and Cable	28521MC	60 lbs.	\$ 50.60
Headlight with Single End Equipment	28522MC	90 lbs.	67.55
Headlights (Two) with Double End Equipment	28523MC	140 lbs.	119.85

For 4 Amperes, 550 Volts D. C., Metallic Circuit

Headlight with Two Plugs and Cable	28524MC	60 lbs.	\$ 50.60
Headlight with Single End Equipment	28525MC	95 lbs.	70.90
Headlights (Two) with Double End Equipment	28526MC	145 lbs.	123.20

List prices for above headlight arranged for voltages other than standard, on application.
Above list prices include one upper and one lower electrode.

If specified on the order, the above headlight will be furnished with "Noglare" semaphore lens, at an advance of \$3.30 in list price.

Shipping dimensions of headlight with single end equipment, 31 x 19¹/₂ x 12 inches; shipping dimensions of headlight with double end equipment, 48 x 19¹/₂ x 12 inches.

Wiring diagrams, see page 79, diagrams Nos. 1 and 2.

Dimensional diagram, page 81, diagram No. 3.

Wiring equipments included in above listings are listed separately on page 66.

Assembled and detail parts, pages 87 to 92, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Luminous Arc Headlight for Electric Mine Locomotives

Type MLD—Arc Only—Continued

Turret Base— $8\frac{3}{8}$ -Inch Optical Semaphore Lens in Door



Type MLD Headlight with Turret Base

For 4 Amperes, 250 Volts D. C., Metallic Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Two Plugs, Cable and Turret Base.	28527MC	75 lbs.	\$63.95
Headlight with Turret Base and Wiring Equipment	28528MC	100 lbs.	80.90

For 4 Amperes, 550 Volts D. C., Metallic Circuit

Headlight with Two Plugs, Cable and Turret Base.	28529MC	75 lbs.	\$63.95
Headlight with Turret Base and Wiring Equipment	28530MC	105 lbs.	84.25

List prices for above headlight arranged for voltages other than standard, on application. Above list prices include one upper and one lower electrode.

If specified on the order, the above headlight will be furnished with "Noglare" semaphore lens, at an advance of \$3.30 in list price.

Shipping dimensions of headlight with wiring equipment, 31 x 19½ x 12 inches.

Wiring diagram, page 79, diagram No. 1.

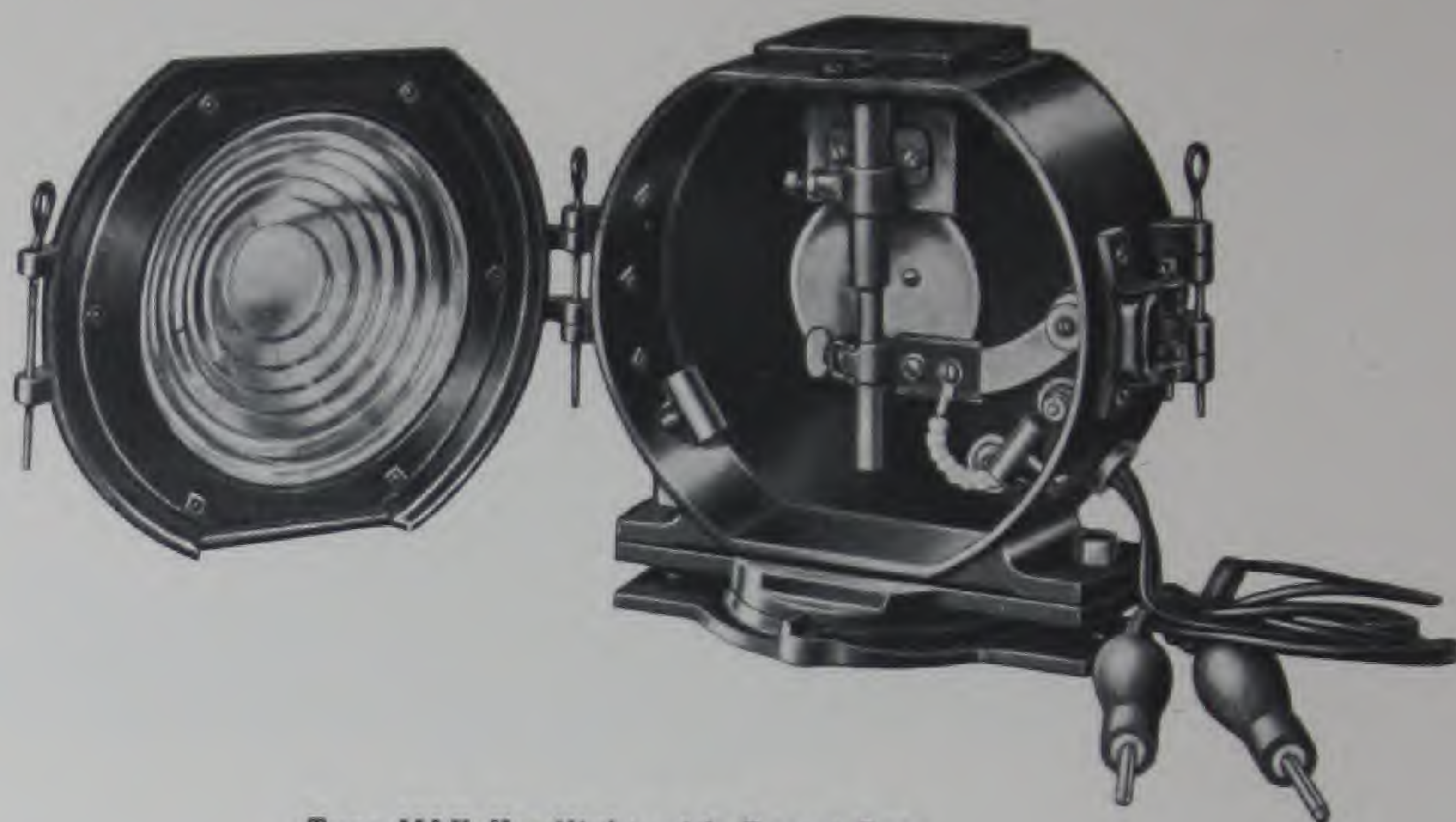
Dimensional diagrams, page 81, diagram No. 3 and page 82, diagram No. 2

Wiring equipments included in above listings are listed separately on page 66.

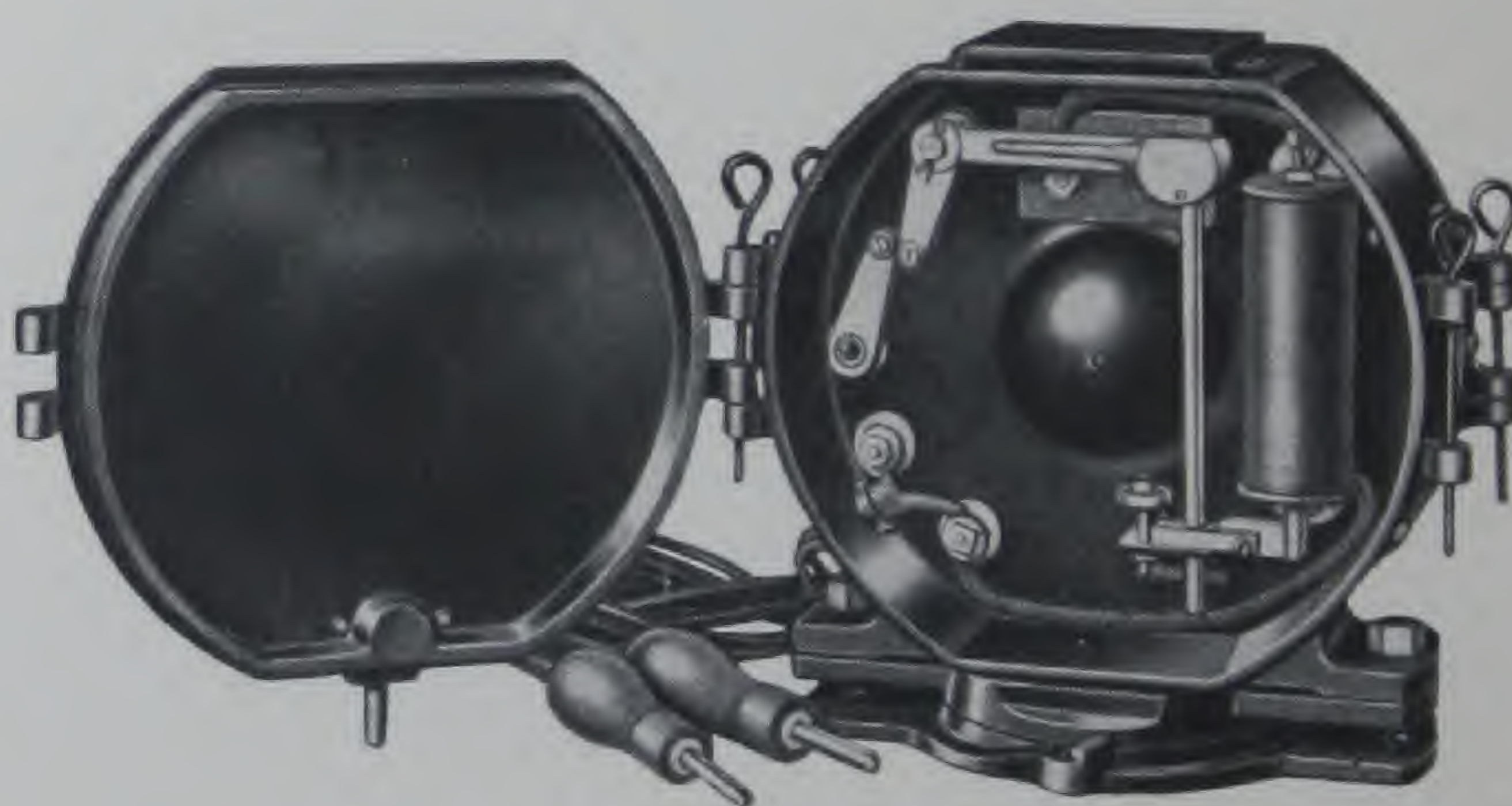
Assembled and detail parts, pages 87 to 92, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Luminous Arc Headlight for Electric Mine Locomotives



Type MLK Headlight with Turret Base
(Front Door Open)



Type MLK Headlight with Turret Base
(Rear Door Open)

Imperial Luminous Arc Headlight for Electric Mine Locomotives

Type MLK—Arc Only

Type MLK headlights—listed on pages 50, 51 and 52—was designed to meet the demand for a luminous arc, mine headlight somewhat smaller than types ML, MLF and MLD headlights. The electrodes used with type MLK are necessarily shorter than those for the larger headlights and, consequently, do not burn quite so long, the upper electrode lasting about 2500 hours of actual service and the lower electrode about 75 hours. To obtain the best results, the length of arc in this type of headlight should be from $\frac{5}{16}$ to $\frac{3}{8}$ of an inch.

As with type MLD, the interior of the case is divided into two compartments by a partition. This partition is a part of the case casting and supports the mechanism. The front compartment contains the electrodes, electrode holders and a four-inch spherical, aluminum reflector. The rear compartment contains the operating mechanism.

This form of construction protects the operating mechanism from fumes and deposits caused by the consumption of the electrodes.

The case is provided with both front and back doors, which permit easy access to the interior parts. Case and doors are cast iron.

The front door is furnished with a semaphore lens, around which is a protecting collar, cast as a part of the door frame. The back door is hinged and rabbeted to make a tight joint with the edge of the case.

The case is so constructed as to provide for a sufficient circulation of air to carry off fumes and deposits. The illumination provided by this headlight, while not so great as that provided by types ML, MLF and MLD, is still sufficient to light up the run-way of the mine.

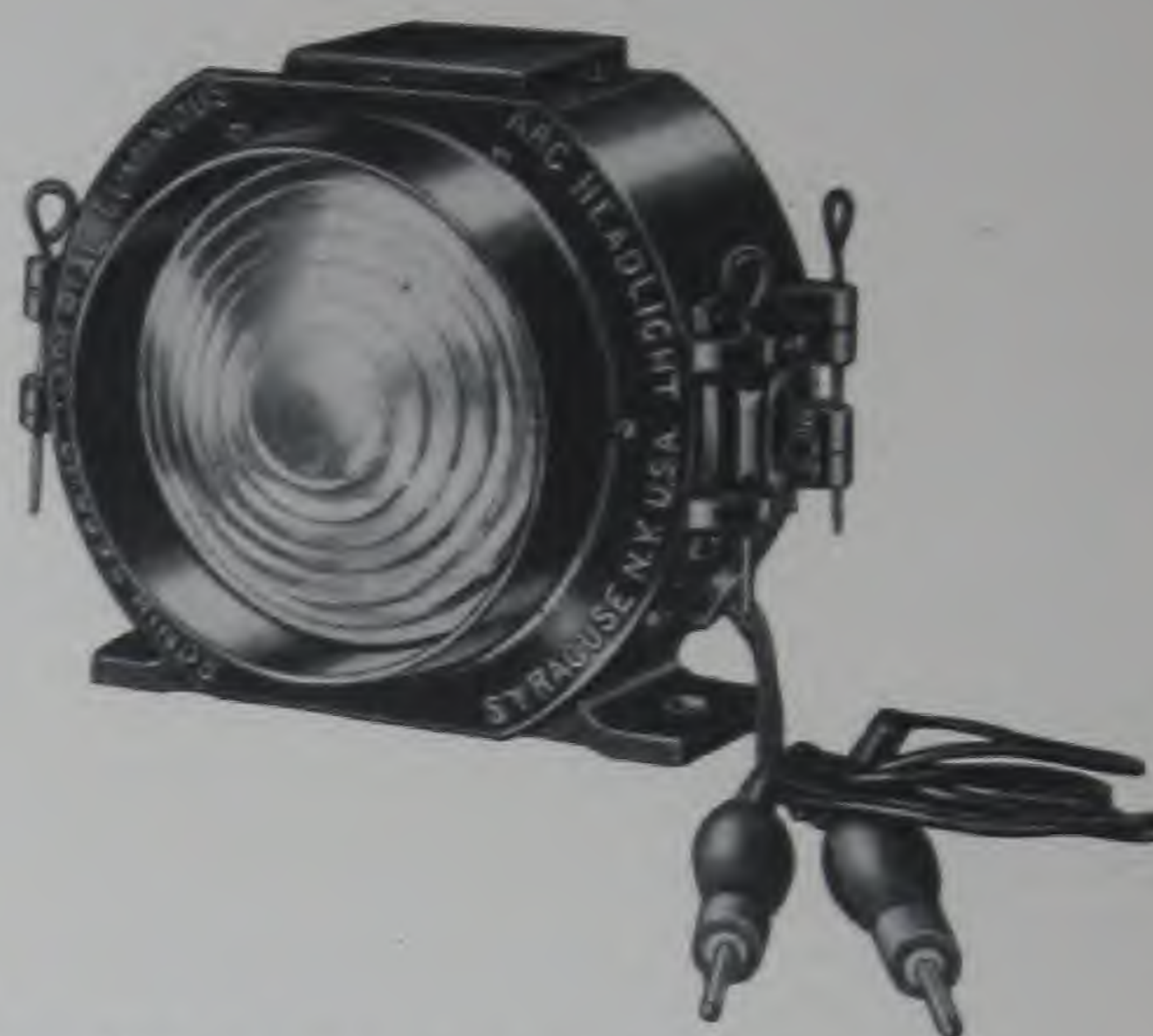
This headlight is furnished in three styles. One is designed to be rigidly secured to the locomotive. Another is to be mounted on a turret base, which allows the headlight to be revolved through 180 degrees and lock in position. When mounted on a turret base, only one headlight is required to a locomotive, and, furthermore, the beam of light may be thrown up into the entry to facilitate loading. The third type of headlight is portable, and is furnished with hanger hooks and bumper studs.

Some operating departments prefer a headlight which gives a yellow beam of light, and to this end type MLK headlight may be equipped with a "Noglare" semaphore lens. This "Noglare" lens, produces a beam of light tinged with yellow, due to the absorption of rays at the blue end of the spectrum.

Imperial Luminous Arc Headlight for Electric Mine Locomotives

Type MLK—Arc Only

Stationary Base—7³/₈-Inch Optical Semaphore Lens in Door



Type MLK Headlight with Stationary Base

For 2 Amperes, 250 Volts D. C., Metallic Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Two Plugs and Cable	28012MC	50 lbs.	\$35.45
Headlight with Single End Equipment	28013MC	65 lbs.	50.30
Headlights (Two) with Double End Equipment	28014MC	115 lbs.	87.45

For 2 Amperes, 550 Volts D. C., Metallic Circuit

Headlight with Two Plugs and Cable	28009MC	50 lbs.	\$35.45
Headlight with Single End Equipment	28010MC	75 lbs.	53.65
Headlights (Two) with Double End Equipment	28011MC	120 lbs.	90.80

List prices for above headlight arranged for voltages other than standard, on application. Above list prices include one upper and one lower electrode.

If specified on the order, the above headlight will be furnished with "Noglare" semaphore lens, at an advance of \$3.30 in list price.

Shipping dimensions of headlight with single end equipment, 26 x 15 x 10¹/₂ inches; shipping dimensions of headlight with double end equipment, 38 x 19 x 10¹/₂ inches.

Wiring diagrams, page 79, diagrams Nos. 1 and 2.

Dimensional diagram, page 81, diagram No. 4.

Wiring equipments included in above listings are listed separately on page 67.

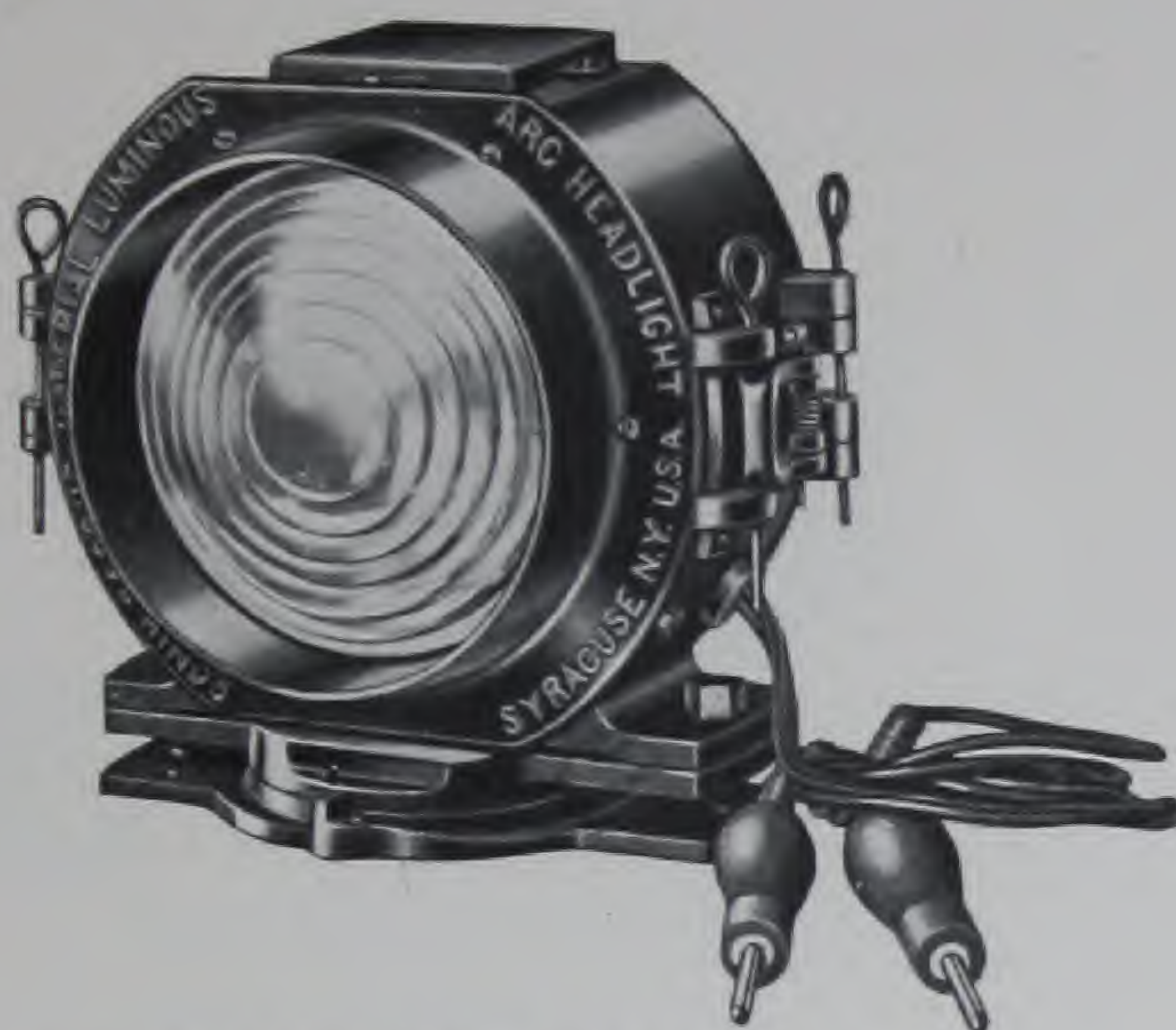
Assembled and detail parts, pages 86 to 92, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Luminous Arc Headlight for Electric Mine Locomotives

Type MLK—Arc Only—Continued

Turret Base—7³/₈-Inch Optical Semaphore Lens in Door



Type MLK Headlight with Turret Base

For 2 Amperes, 250 Volts D. C., Metallic Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Two Plugs, Cable and Turret Base.	28017MC	60 lbs.	\$48.80
Headlight with Turret Base and Wiring Equipment	28018MC	75 lbs.	63.65

For 2 Amperes, 550 Volts D. C., Metallic Circuit

Headlight with Two Plugs, Cable and Turret Base.	28015MC	60 lbs.	\$48.80
Headlight with Turret Base and Wiring Equipment	28016MC	80 lbs.	67.00

List prices for above headlight arranged for voltages other than standard, on application. Above list prices include one upper and one lower electrode.

If specified on the order, the above headlight will be furnished with "Noglare" semaphore lens, at an advance of \$3.30 in list price.

Shipping dimensions of headlight with wiring equipment, 26 x 15 x 10¹/₄ inches.

Wiring diagram, page 79, diagram No. 1.

Dimensional diagrams, page 81, diagram No. 4, and page 82, diagram No. 3.

Wiring equipments included in above listings are listed separately on page 67.

Assembled and detail parts, pages 86 to 92, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Luminous Arc Headlight for Electric Mine Locomotives

Type MLK—Arc Only—Continued

Portable—8³/₈-Inch Optical Semaphore Lens in Door



Type MLK Headlight—Portable

For 2 Amperes, 250 Volts D. C., Metallic Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Two Plugs and Cable	28050MC	55 lbs.	\$35.45
Headlight with Single End Equipment	28051MC	75 lbs.	49.15
Headlight with Double End Equipment	28052MC	80 lbs.	52.00

For 2 Amperes, 500 Volts D. C., Metallic Circuit

Headlight with Two Plugs and Cable	28053MC	55 lbs.	\$35.45
Headlight with Single End Equipment	28054MC	85 lbs.	52.50
Headlight with Double End Equipment	28055MC	90 lbs.	55.35

List prices for above headlight arranged for voltages other than standard, on application.
Above list prices include one upper and one lower electrode.

If specified on the order, the above headlight will be furnished with "Noglare" semaphore lens, at an advance of \$3.30 in list price.

Shipping dimensions of complete equipment, 35 x 17¹/₂ x 11³/₄ inches.

Wiring diagrams, page 79, diagrams Nos. 1 and 2.

Dimensional diagram, page 81, diagram No. 4.

Wiring equipments included in above listings are listed separately on page 67.

Assembled and detail parts, pages 86 to 92, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

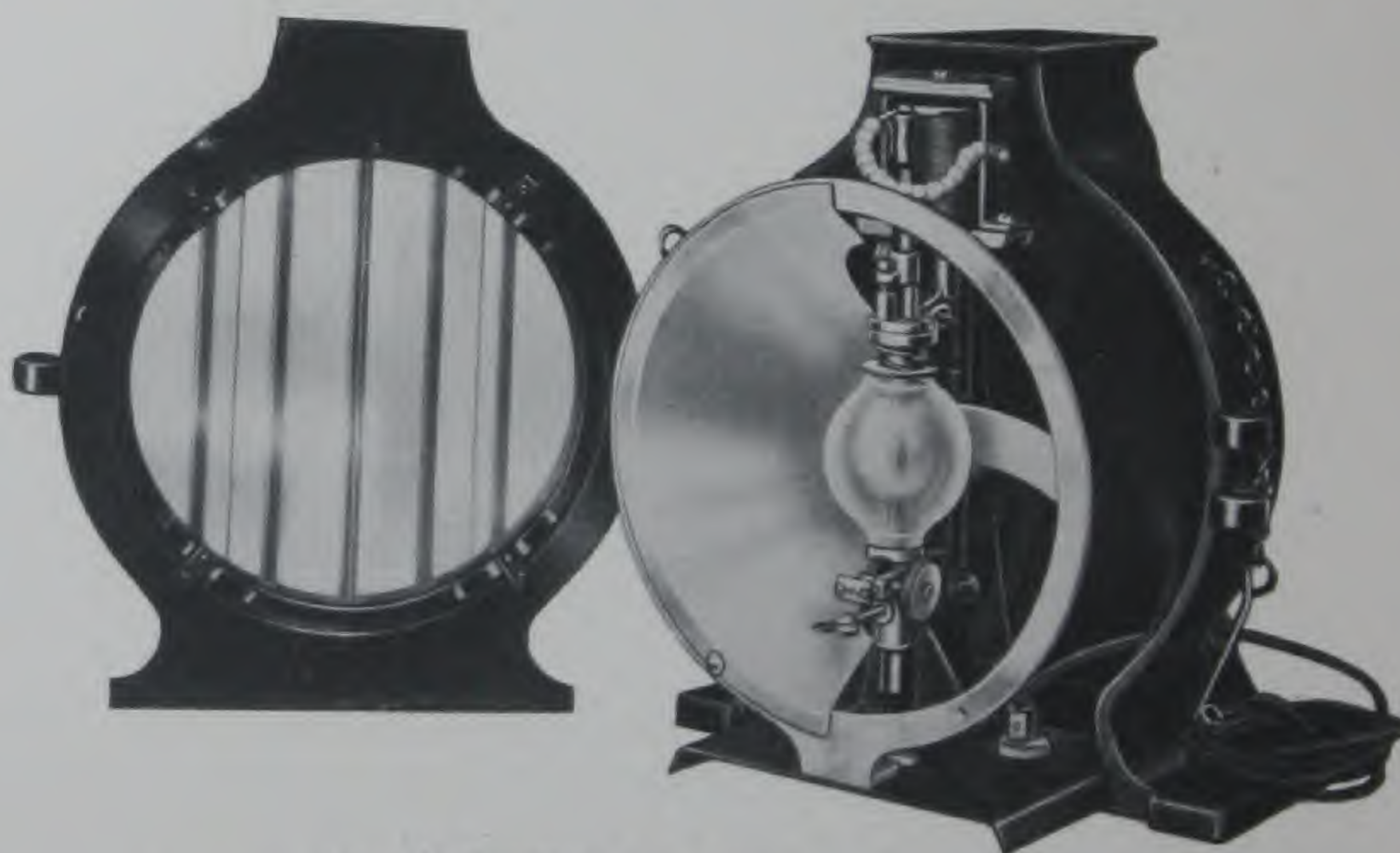
CROUSE-HINDS
IMPERIAL CARBON ARC HEADLIGHTS
FOR ELECTRIC MINE LOCOMOTIVES

Imperial Carbon Arc Headlight for Electric Mine Locomotives

Type M—Arc Only



Type M Headlight with Turret Base
(Front Door Closed)



Type M Headlight with Stationary Base
(Front Door Open and Mechanism Partly Withdrawn)

Imperial Carbon Arc Headlight for Electric Mine Locomotives

Type M

Type M headlight—listed on pages 56 and 57—has long been recognized as a standard headlight for use on mine locomotives. Its mechanism is of the vertical carbon form of construction, and it is furnished with a nine-inch polished aluminum reflector.

The entire mechanism is fastened to a frame which, in turn, is mounted upon a base plate. This base plate engages grooves in the bottom of the headlight case, and the entire mechanism can be withdrawn at will through the door opening. Thus, it is possible to renew carbons or readjust operating parts without unfastening the case from the locomotive.

The case is of heavy cast iron and closely conforms to the contour of the mechanism, giving the greatest possible degree of compactness. The door frame also is cast iron, and has five vertical bars or grids that afford protection to the double thick clear glass with which the door is furnished.

This headlight is furnished in two styles. One is designed to be rigidly secured to the locomotive, and the other to be mounted on a turret base, allowing the headlight to be revolved through 180 degrees and lock in position. When mounted on a turret base, only one headlight is required to a locomotive, and furthermore, the beam of light may be thrown up into the entry to facilitate loading.

To obtain the best results, the length of arc in above headlight should be from $\frac{3}{16}$ to $\frac{1}{4}$ of an inch in length.

Imperial Carbon Arc Headlight for Electric Mine Locomotives

Type M—Arc Only

Stationary Base—Plain Glass in Door—9-Inch Paraboloidal Aluminum Reflector



Type M Headlight with Stationary Base

For 4 Amperes, 250 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Cable	28022	65 lbs.	\$29.50
Headlight with Single End Equipment	28023	90 lbs.	39.40
Headlights (Two) with Double End Equipment	28024	145 lbs.	69.80

For 4 Amperes, 550 Volts D. C., Grounded Circuit

Headlight with Cable	23907	65 lbs.	\$29.50
Headlight with Single End Equipment	23905	95 lbs.	42.35
Headlights (Two) with Double End Equipment	23902	150 lbs.	72.75

List prices for above headlight arranged for voltages other than standard, on application.

Above list prices include four sets of carbons and two clear inner globes per headlight.

If specified on the order, above headlight will be furnished with a nickel-plated copper reflector, without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" front glass, at an advance of \$4.00 in list price.

Shipping dimensions of headlight with single end equipment, 31 x 19 $\frac{3}{4}$ x 12 inches; shipping dimensions of headlight with double end equipment, 48 x 19 $\frac{3}{4}$ x 12 inches.

Wiring diagrams, page 79, diagrams Nos. 3 and 4.

Dimensional diagram, page 81, diagram No. 1.

Wiring equipments included in above listings are listed separately on page 67.

Assembled and detail parts, pages 99 to 105, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Carbon Arc Headlight for Electric Mine Locomotives

Type M—Arc Only—Continued

Turret Base—Plain Glass in Grid Door—9-Inch Paraboloidal Aluminum Reflector



Type M Headlight with Turret Base

For 4 Amperes, 250 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Turret Base and Cable	28025	80 lbs.	\$40.70
Headlight with Turret Base and Wiring Equipment	28026	105 lbs.	50.60

For 4 Amperes, 550 Volts D. C., Grounded Circuit

Headlight with Turret Base and Cable	23910	80 lbs.	\$40.70
Headlight with Turret Base and Wiring Equipment	23908	110 lbs.	53.60

List prices for above headlight arranged for voltages other than standard, on application.
Above list prices include four sets of carbons and two clear inner globes per headlight.

If specified on the order, above headlight will be furnished with a nickel-plated copper reflector, without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" front glass, at an advance of \$4.00 in list price.

Shipping dimensions of headlight with single end equipment, 31 x 19 $\frac{3}{4}$ x 12 inches.

Wiring diagram, page 79, diagram No. 3.

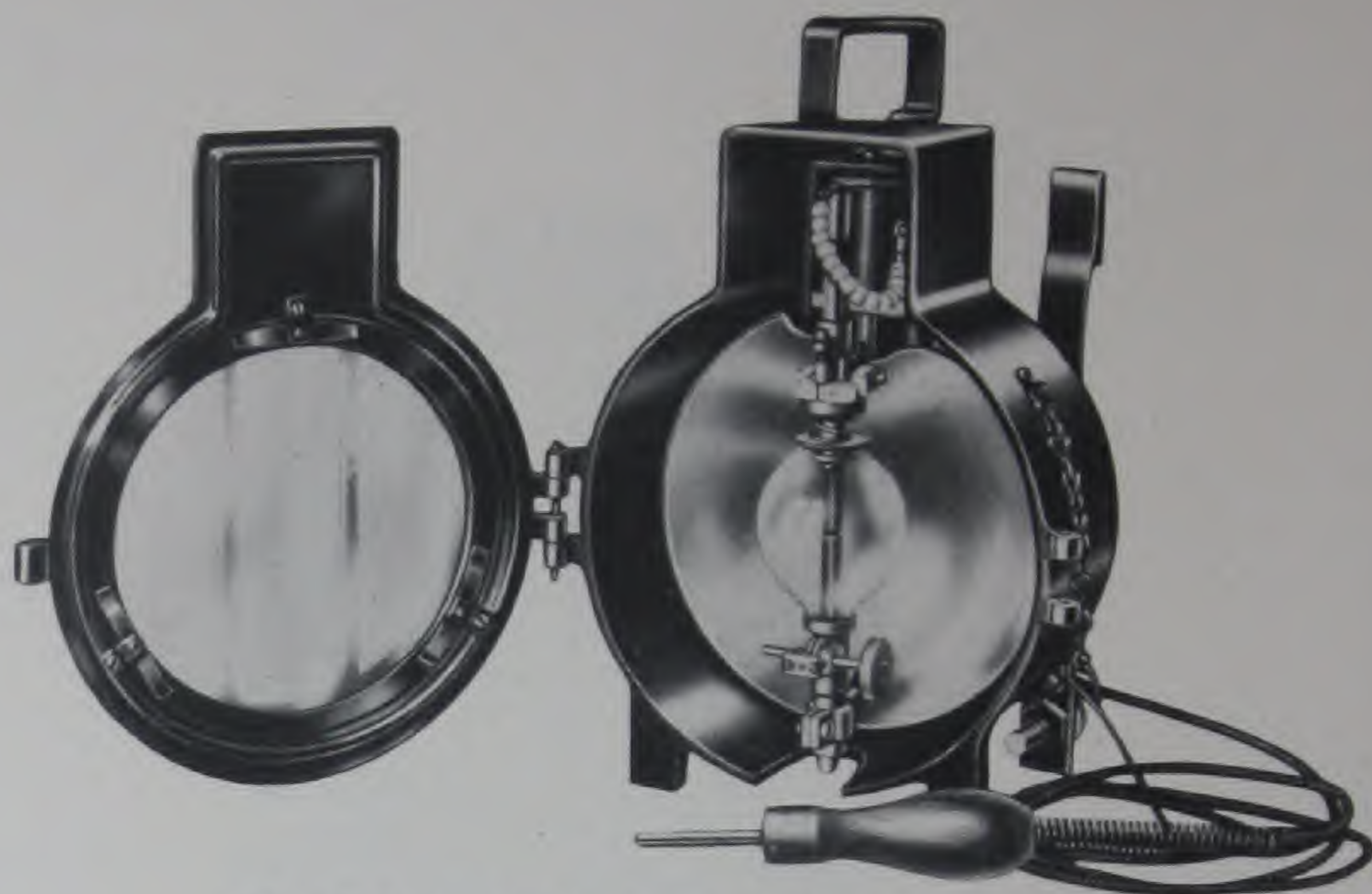
Dimensional diagrams, page 81, diagram No. 1, and page 82, diagram No. 1.

Wiring equipments included in above listings are listed separately on page 67.

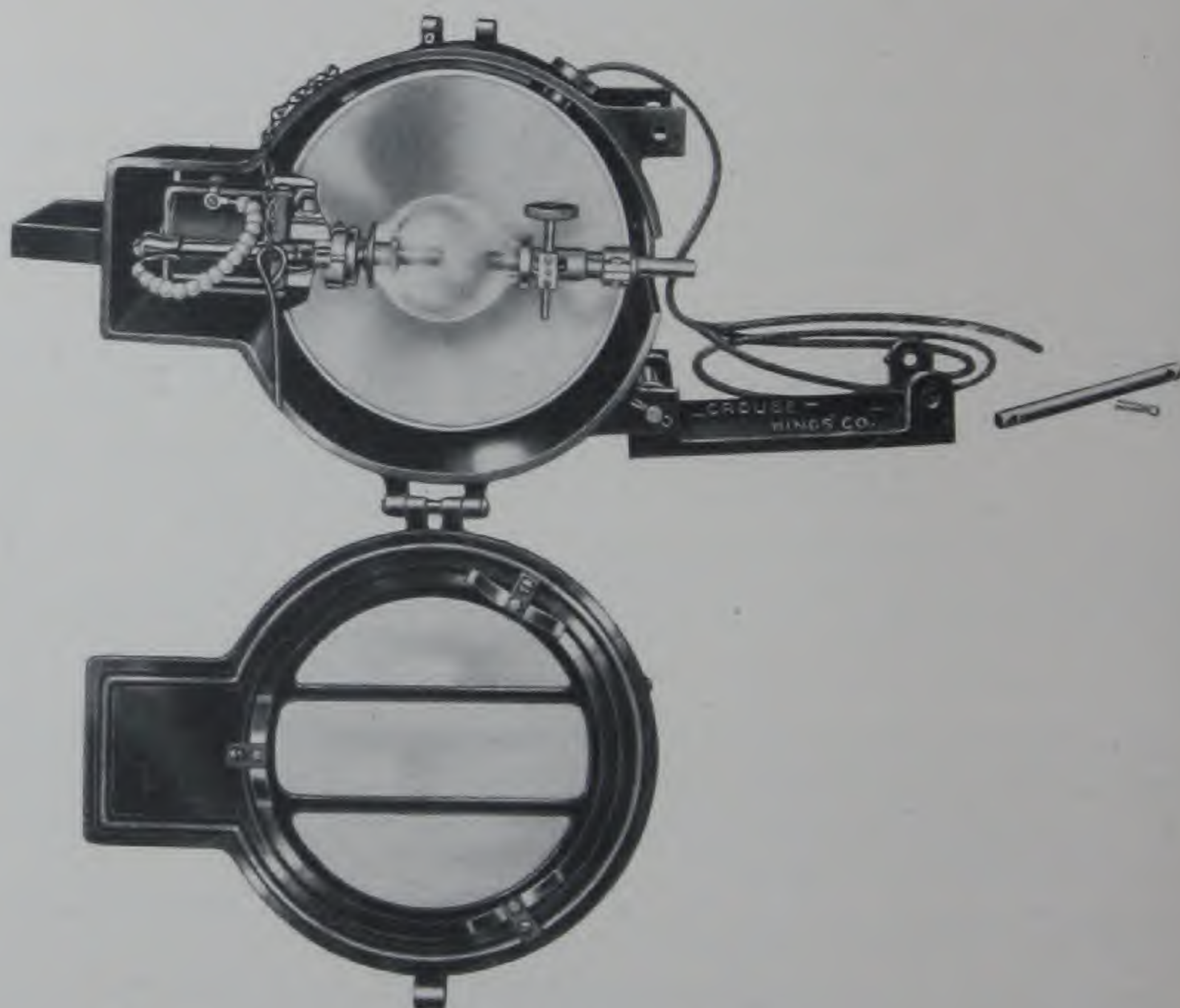
Assembled and detail parts, pages 99 to 105, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.

Imperial Carbon Arc Headlights for Electric Mine Locomotives
Types V and VR—Arc Only



Type V Headlight with Front Door Open



Type VR Headlight, Showing Use of Rocker Base

Imperial Carbon Arc Headlights for Electric Mine Locomotives

Types V and VR—Arc Only

Type V headlight—listed on page 60—was designed to give more illumination than the ordinary incandescent headlight, but not as much as the larger types of carbon arc headlights. The result is that type V headlight gives a light which illuminates a considerable distance ahead of the locomotive.

The mechanism, which is the vertical carbon form, is simple and easily inspected and repaired. The door frame, like the case, is cast iron and has two grids that protect the double thick clear glass in the door.

This headlight is made in two forms—one for mounting by means of dash hangers and the other has a rocker base to which the headlight proper is fastened by bolts. The rocker base is intended to rest upon and be bolted to a supporting surface. By withdrawing one of the connecting bolts, the headlight can be tipped on its side. This allows the replacement of carbons through the bottom of the headlight case.

When equipped with a rocker base, as described, this headlight takes the type letters VR, and is listed as such on page 61. Types V and VR headlights, because of their strength and illuminating characteristics, make very acceptable headlights for mine locomotives.

Type VR headlight is furnished in two styles. One is designed to be rigidly secured to the locomotive, and the other to be mounted on a turret base, allowing the headlight to be revolved through 180 degrees and lock in position. When mounted on a turret base, only one headlight is required to a locomotive, and, furthermore, the beam of light may be thrown up into the entry to facilitate loading.

To obtain the best results, the length of arc in above headlights should be from $\frac{3}{16}$ to $\frac{1}{4}$ of an inch in length.

Type V—Arc Only

A black and white photograph of a vintage Imperial Junior electric lamp. The lamp features a circular glass lens with vertical bars, a black metal frame, and a handle on top. Text on the frame includes "IMPERIAL JUNIOR", "PAT'D", "APR. 7, 1941", and "GENUINE PATENTED". A power cord is attached to the side.

For 2 Amperes, 250 Volts D. C., Grounded Circuit			
Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Plug and Cable	28041	35 lbs.	\$16.85
Headlight with Single End Equipment	28043	60 lbs.	27.50
Headlight with Double End Equipment	28045	65 lbs.	29.10

Headlight with Plug and Cable	24082	40 lbs.	\$16.85
Headlight with Single End Equipment.	24087	70 lbs.	30.45
Headlight with Double End Equipment	24088	75 lbs.	32.10

Imperial Carbon Arc Headlight for Electric Mine Locomotives

Type VR—Arc Only

Rocker Base—Plain Glass in Grid Door—8-Inch Paraboloidal Aluminum Reflector



Type VR Headlight with Rocker Base

For 2 Amperes, 250 Volts D. C., Grounded Circuit

Equipment	Catalog Number	Shipping Weight	List Price Each
Headlight with Cable	28027	45 lbs.	\$18.95
Headlight with Single End Equipment	28028	70 lbs.	28.90
Headlight with Cable and Turret Base	28730	55 lbs.	32.30
Headlight with Single End Equipment and Turret Base	28731	80 lbs.	42.45
Headlights (Two) with Double End Equipment	28029	110 lbs.	48.70

For 2 Amperes, 550 Volts D. C., Grounded Circuit

Headlight with Cable	24601	45 lbs.	\$18.95
Headlight with Single End Equipment	24605	75 lbs.	31.80
Headlight with Cable and Turret Base	28732	55 lbs.	32.30
Headlight with Single End Equipment and Turret Base	28733	85 lbs.	45.15
Headlights (Two) with Double End Equipment	24655	115 lbs.	51.65

List prices for above headlight arranged for voltages other than standard, on application. Above list prices include four sets of carbons and two clear inner globes per headlight.

If specified on the order, above headlight will be furnished with a nickel-plated copper reflector, without extra charge.

If specified on the order, the above headlight will be furnished with "Noglare" front glass, at an advance of \$3.30 in list price.

Shipping dimensions of headlight with single end equipment, 26 x 18½ x 10 inches; shipping dimensions of headlight with double end equipment, 36 x 18½ x 10 inches.

Wiring diagrams, page 79, diagrams Nos. 3 and 4.

Dimensional diagrams, page 81, diagram No. 6, and page 82, diagram No. 3.

Wiring equipments included in above listings are listed separately on page 67.

Assembled and detail parts, pages 106 to 109, inclusive.

When ordering headlight, state maximum and minimum voltage of trolley circuit.



**WIRING EQUIPMENTS,
WIRING EQUIPMENT PARTS
AND DIAGRAMS
FOR IMPERIAL HEADLIGHTS**

Wiring Equipments



Parts Included in Wiring Equipment

Main Resistor, Plug Receptacles, Fuse Block,
Fuse, Switches and Dash Hanger

Equipments			Amp.	Volts	Catalog Number	List Each
For Types LAA, LCA and LGA Headlights						
Grounded Circuit	Single End	Main Resistor, Double Plug Receptacle, Fuse, Fuse Block, Two-Way Multiple Break Switch and Dash Hanger . . .	4	575	24220	\$20.30
	Double End	Main Resistor, Two Double Plug Receptacles, Fuse, Fuse Block, Two Two-Way Multiple Break Switches and Two Dash Hangers . . .	4	575	24221	\$26.40
Multiple Circuit	Single End	Main Resistor, One Double and One Single Plug Receptacle, Fuse, Fuse Block, Two-Way Multiple Break Switch and Dash Hanger . . .	4	575	24220MC	\$21.15
	Double End	Main Resistor, Two Double and Two Single Plug Receptacles, Fuse, Fuse Block, Two Two-Way Multiple Break Switches and Two Dash Hangers . . .	4	575	24221MC	\$28.10

Catalog numbers of parts included in above wiring equipments are as follows:

Main resistor: 4-ampere, 575 volts—HL2115. Double plug receptacle—HL2141. Single plug receptacle—HL2105. Fuse—HL134. Fuse block—HL133. Two-way multiple break switch—HL1308. Dash hanger—HL5161.

Parts included in wiring equipments are listed separately on pages 69, 70 and 71. Wiring equipments are listed on pages 64 to 67, inclusive.

Wiring Equipments—Continued

Equipments			Amp.	Volts	Catalog Number	List Each
For Types LBA, LDA and LHA Headlights						
Grounded Circuit	Single End	Main Resistance, Single Plug Receptacle, Fuse, Fuse Block, One-Way Multiple Break Switch and Dash Hanger	4	575	24320	\$19.45
	Double End	Main Resistance, Two Single Plug Receptacles, Fuse, Fuse Block, Two One-Way Multiple Break Switches and Two Dash Hangers	4	575	24321	\$24.70
Metallic Circuit	Single End	Main Resistance, Two Single Plug Receptacles, Fuse, Fuse Block, Multiple Break Reversing Switch and Dash Hanger	4	575	24320MC	\$20.30
	Double End	Main Resistance, Four Single Plug Receptacles, Fuse, Fuse Block, Two Multiple Break Reversing Switches and Two Dash Hangers	4	575	24321MC	\$26.40

For Type LK Headlight

Grounded Circuit	Single End	Main Resistance, Single Plug Receptacle, Fuse, Fuse Block, One-Way Multiple Break Switch and Dash Hanger	4	575	27180	\$19.45
			2	575	27182*	\$16.20
	Double End	Main Resistance, Two Single Plug Receptacles, Fuse, Fuse Block, Two One-Way Multiple Break Switches and Two Dash Hangers	4	575	27181	\$24.70
			2	575	27183*	\$18.20
Metallic Circuit	Single End	Main Resistance, Two Single Plug Receptacles, Fuse, Fuse Block, Multiple Break Reversing Switch and Dash Hanger	4	575	27180MC	\$20.30
			2	575	27182MC*	\$17.05
	Double End	Main Resistance, Four Single Plug Receptacles, Fuse, Fuse Block, Two Multiple Break Reversing Switches and Two Dash Hangers	4	575	27181MC	\$26.40
			2	575	27183MC*	\$19.90

For Type LP Headlight

Grounded Circuit Single End	Main Resistance, Fuse, Fuse Block and One-Way Multiple Break Switch	4	575	27280	\$18.60
		2	575	27282*	\$15.35

*This equipment includes a one-way snap switch, instead of a one-way multiple break switch, but a one-way multiple break switch will be furnished, if specified on the order, at an advance of \$3.25 in the list price of equipment.

Catalog numbers of parts included in above wiring equipments are as follows:

Main resistance: 4-ampere, 575 volts—HL2115; 2-ampere, 550 volts—HL2598. Single plug receptacle—HL2105. Fuse—HL134. Fuse block—HL133. One-way multiple break switch—HL110S. Multiple break reversing switch—HL150S. One-way snap switch—HL110. Dash hanger—HL5161.

Parts included in wiring equipments are listed separately on pages 69, 70 and 71.

Wiring equipments are listed on pages 64 to 67, inclusive.

Wiring Equipments—Continued

Equipments			Amp.	Volts	Catalog Number	List Each
For Types A, C, H, K, P and Q Headlights						
Grounded Circuit	Single End	Main Resistance, Double Plug Receptacle, Fuse, Fuse Block, Two-Way Snap Switch and Dash Hanger	4	575	17828	\$15.25
	Double End	Main Resistance, Two Double Plug Receptacles, Fuse, Fuse Block, Two Two-Way Snap Switches and Two Dash Hangers . .	4	575	17829	\$18.50
For Types B, D, J and L Headlights						
Grounded Circuit	Single End	Main Resistance, Single Plug Receptacle, Fuse, Fuse Block, One-Way Snap Switch and Dash Hanger	4	575	17832	\$13.60
	Double End	Main Resistance, Two Single Plug Receptacles, Fuse, Fuse Block, Two One-Way Snap Switches and Two Dash Hangers .	4	575	17833	\$15.25
For Type V Headlight						
Grounded Circuit	Single End	Main Resistance, Single Plug Receptacle, Fuse, Fuse Block, One-Way Snap Switch and Dash Hanger	4	575	28070	\$13.60
			2	575 or 550	24091	\$13.60
			2	250	28072	\$10.65
	Double End	Main Resistance, Two Single Plug Receptacles, Fuse, Fuse Block, Two One-Way Snap Switches and Two Dash Hangers .	4	575	28071	\$15.25
			2	575 or 550	24092	\$15.25
			2	250	28073	\$12.30
For Types ML, MLF and MLD Headlights						
Metallic Circuit	Single End and Turret	Main Resistance, Two Single Plug Receptacles, Fuse, Fuse Block and One-Way Multiple Break Switch	4	550	28074	\$20.30
			4	250	28076	\$16.95
	Double End	Main Resistance, Four Single Plug Receptacles, Fuse, Fuse Block and Two-Way Multiple Break Switch	4	550	28075	\$22.00
			4	250	28077	\$18.75

If specified on the order, above equipments that regularly include one-way or two-way snap switches will be furnished with corresponding multiple break switches, at an advance in list price of \$3.25 for the one-way multiple break switch HL110S, and at an advance in the list price of \$2.10 for the two-way multiple break switch HL140S.

Catalog numbers of parts included in above wiring equipments are as follows:

Main resistance: 4-ampere, 575 or 550 volts—HL2115; 2-ampere, 575 or 550 volts—HL2598; 4-ampere, 250 volts—HL2119; 2-ampere, 250 volts—HL5600. Double plug receptacle—HL2141. Single plug receptacle—HL2105. Fuse—HL134. Fuse block—HL133. Two-way multiple break switch—HL140S. One-way multiple break switch—HL110S. Two-way snap switch—HL140. One-way snap switch—HL110. Dash hanger—HL5161.

Parts included in wiring equipments are listed separately on pages 69, 70 and 71.

Wiring equipments are listed on pages 64 to 67, inclusive.

Wiring Equipments—Continued

Equipments	Amp.	Volts	Catalog Number	List Each
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For Type MLK Headlight—Portable

Metallic Circuit	Single End	Main Resistance, Two Single Plug Receptacles, Fuse, Fuse Block, One-Way Snap Switch and Dash Hanger	2	550	28078	\$17.05
			2	250	28080	\$13.70
	Double End	Main Resistance, Four Single Plug Receptacles, Fuse, Fuse Block, Two One-Way Snap Switches and Two Dash Hangers	2	550	28079	\$19.90
			2	250	28081	\$16.55

For Type MLK Headlight—Stationary and Turret Base

Metallic Circuit	Single End and Turret	Main Resistance, Two Single Plug Receptacles, Fuse, Fuse Block and One-Way Snap Switch	2	550	28082	\$17.05
			2	250	28084	\$13.70
	Double End	Main Resistance, Four Single Plug Receptacles, Fuse, Fuse Block and Two-Way Snap Switch	2	550	28083	\$19.90
			2	250	28085	\$16.55

For Type M Headlight

Grounded Circuit	Single End and Turret	Main Resistance, Fuse, Fuse Block and One-Way Snap Switch	4	550	28086	\$12.85
			4	250	28088	\$ 9.90
	Double End	Main Resistance, Fuse, Fuse Block and Two-Way Snap Switch	4	550	28087	\$13.75
			4	250	28089	\$10.80

For Type VR Headlight

Grounded Circuit	Single End	Main Resistance, Fuse, Fuse Block and One-Way Snap Switch	2	550	28090	\$12.85
			2	250	28092	\$ 9.50
	Double End	Main Resistance, Fuse, Fuse Block and Two-Way Snap Switch	2	550	28091	\$12.75
			2	250	28093	\$10.80

If specified on the order, above equipments that regularly include one-way or two-way snap switches will be furnished with corresponding multiple break switches, at an advance in list price of \$3.25 for the one-way multiple break switch HL110S, and at an advance of \$2.10 in the list price for the two-way multiple break switch HL140S.

Catalog numbers of parts included in above wiring equipments are as follows:

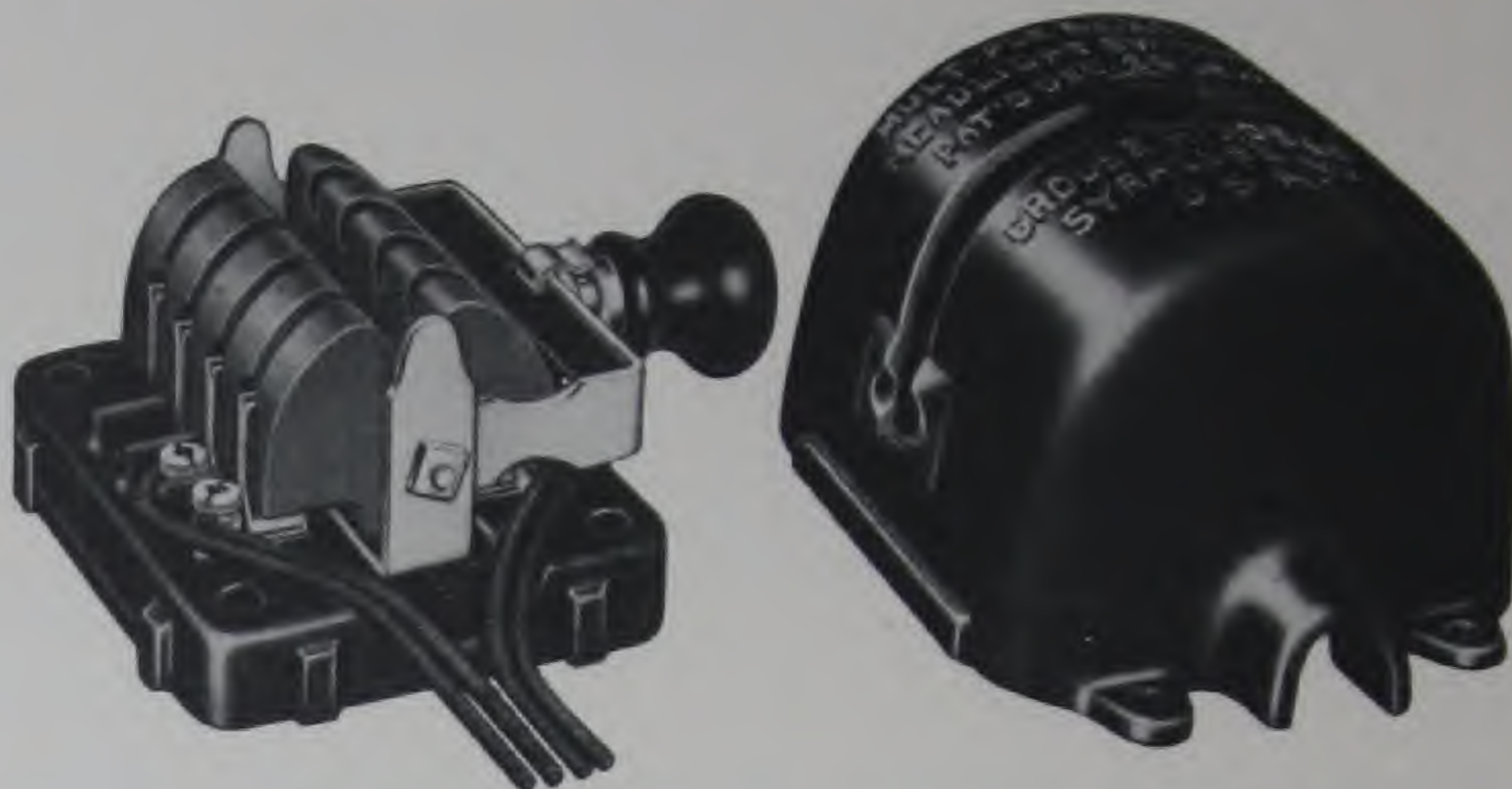
Main resistance: 4-ampere, 550 volts—HL2115; 2-ampere, 550 volts—HL2598; 4-ampere, 250 volts—HL2119; 2-ampere, 250 volts—HL5600. Single plug receptacle—HL2105. Fuse—HL134. Fuse block—HL133. One-way snap switch—HL110. One two-way snap switch—HL140. Dash hanger for portable type MLK—HL5161.

Parts included in wiring equipments are listed separately on pages 69, 70 and 71.

Wiring equipments are listed on pages 64 to 67, inclusive.

Crouse-Hinds Multiple Break Headlight Switches

One-Way, Two-Way and Reversing



Crouse-Hinds Two-Way Multiple Break Switch with Cover Removed

The Multiple Break switch is a distinct improvement over the snap switch, or any other type of switch designed for Headlight service. It is for use with headlights or on any circuit not over 600 volts and 10 amperes capacity.

The base is made of a strong composition which is practically impervious to moisture and is not affected by heat. The crossbar which holds the contact blades, is made of the same composition as the base.

Knife blade and corresponding beveled contacts are used. The ends of the blades are so shaped that when the switch is being closed or opened, the lower edges of blades and tops of clips are parallel. This is a feature of considerable importance, as instant contact or release is obtained along the full width of contact. This form of construction eliminates damage to blades and contacts, which occurs where a point on the edge of the blade touches only a corner of the contact when the switch is being opened or closed.

Between each set of contacts, and extending well above them, are barriers that effectually prevent arcing from one set of contacts to another. These barriers are a single piece of molded composition, similar to that used for the base.

Complete insulation of handle and case from current-carrying parts is secured by having the blades molded into the composition crossbar. Another feature is a spring knob handle which holds the switch closed by engaging a recess on the case. Furthermore, the crossbar is provided with a very strong spring which insures absolute centering of switch when blades are released from closed position. This centering is practically instantaneous, as the construction is such as to eliminate any drag of the handle upon the top of the case.

The position of the handle indicates whether the switch is on or off.

These switches are made in four styles—one-way, two-way, reversing for two-lead resistance and reversing for three-lead resistance. The one-way is for use with straight arc headlights, heaters, pump motors and lighting circuits. The two-way style is for use with combination arc and incandescent headlights. The reversing switches make it possible to reduce the light beam of an Imperial Luminous headlight by reversing the direction of the current through the electrodes. All four styles of switches are the same except in the connections.

Two styles of knob handles—Quick-Removable and Regular—are made for these switches. The Quick-Removable handle can be taken off by exerting a moderate pull, and put on again with an equal pressure. This can only be done, however, when the switch is in an open position. Some railway electricians consider the removable handle an advantage for double end equipments, in that it discourages unauthorized persons from attempting to operate the switch.

Complete listings of Multiple Break switches with both forms of knob handles are given on the following page.

Crouse-Hinds Multiple Break Headlight Switches—Continued

One-Way, Two-Way and Reversing

Listings of Multiple Break Headlight Switches

With Regular Handle

Description	Catalog Number	List Price
One-Way Multiple Break Switch	HL110S	\$4.40
Two-Way Multiple Break Switch	HL140S	4.40
Reversing Multiple Break Switch, for Two-Lead Resistance	HL150S	4.40
Reversing Multiple Break Switch, for Three-Lead Resistance	HL151S	4.40

With Quick Removable Handle

One-Way Multiple Break Switch	HL152S	\$4.40
Two-Way Multiple Break Switch	HL153S	4.40
Reversing Multiple Break Switch, for Two-Lead Resistance	HL154S	4.40
Reversing Multiple Break Switch, for Three-Lead Resistance	HL155S	4.40

Parts of Multiple Break Switch

Description	Catalog Number	List Price Each
Cast Iron Cover	HL6600	\$1.45
Moulded Base	HL6601	1.00
Base Cover	HL6602	.40
No. 6 x 1/2-inch Wood Screws for Base Cover (per doz.)	HL6603	.12
Barrier	HL6604	.80
Standard Yoke	HL6605	.30
Crossbar Yoke with Spring Complete	HL6606	.40
Crossbar with Contact Blades	HL6607	1.20
Screw to Hold Crossbar to Yoke, No. 12-24 x 1/2-inch R. H. Steel		
Nickel (per doz.)	HL6099	.12
Screw to Hold Stem Yoke to Base, No. 12-24 x 5/8-inch, R. H. Steel		
Nickel (per doz.)	HL6608	.12
Hinge Pin No. 12-24 x 4 7/8-inch Steel C. R.	HL6609	.25
No. 12 x 24 Nut sq. hd. Steel for Hinge Pin (per doz.)	HL5104	.12
Spring for Hinge Pin	HL6610	"
Removable Handle Complete	HL6672	1.50
Handle	HL6611	.40
Handle Stud	HL6612	1.00
Handle Spring	HL6613	.30
Washer for Handle, No. 10 Brass, 3/16 x 9/16-inch (per doz.)	HL6689	.24
Screw to Hold Stationary Handle No. 10-24 x 1 3/4-inch, R. H. Steel		
Bright (per doz.)	HL6614	.12
Screw to Hold Removable Handle, No. 10-24 x 5/8-inch, R. H. Steel		
Nickel (per doz.)	HL6673	.24
Contact Clips	HL6615	.25
Screw for Holding Contact Clips to Base, No. 8-32 x 1/2-inch long, R. H. Steel, Copper Plated (per doz.)	HL6616	.12
Connection Screw, No. 8-32 x 3/4-inch, R. H. Brass (per doz.)	HL6617	.12
No. 8 Iron Washer for Screws (per doz.)	HL6618	.06
1 1/4-inch Connection Strip (Copper)	HL6619	.10
2 1/2-inch Connection Strip	HL6620	.15
Lead for Reversing Connection	HL6621	.05
Binding Nuts, No. 8-32 (per doz.)	HL6622	.15

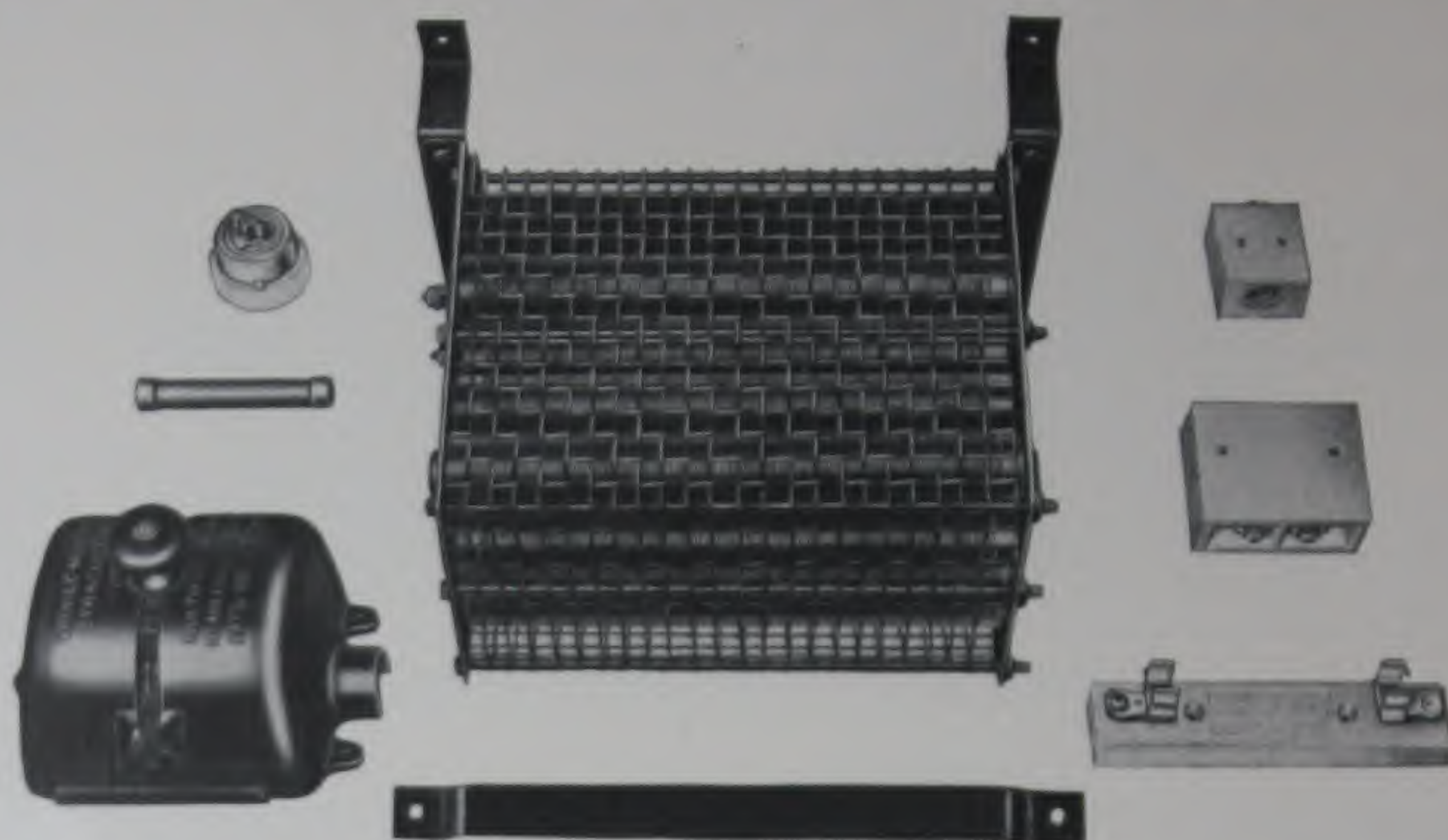
Snap Switches

Description	Catalog Number	List Price Each
One-Way Snap Switch	HL110	\$1.15
Two-Way Snap Switch	HL140	2.30

Dimensions Multiple Break Headlight Switch—Height, 6 inches; width, 5 1/2 inches; length, 7 1/2 inches. Shipping dimensions, 7 x 8 x 9 inches.

Resistances and Wiring Equipment Parts

Included in Wiring Equipments



Parts Included in Wiring Equipment

Main Resistance, Plug Receptacles, Fuse Block, Fuse, Switches and Dash Hanger

Description	Catalog Number	List Price
Complete Resistance, 5 Amperes, 550 to 575 Volts, 94 Ohms (Two-Lead)	HL2117	\$12.45
Resistance Tube and Wire. For Resistances (HL2117, 5601)	HL2118	1.20
Wire. For Resistances (HL2117, 5601) (per lb.)	HL120	2.80
Complete Resistance, 4 Amperes, 550 to 575 Volts, 117 Ohms (Two-Lead)	HL2115	12.45
Resistance Tube and Wire. For Resistances (HL2115, 2119)	HL2116	1.00
Wire. For Resistances (HL2115, 2119) (per lb.)	HL115	2.80
Complete Resistance, 4 Amperes, 250 Volts, 43 Ohms (Two-Lead)	HL2119	9.10
Complete Resistance, 2 Amperes, 550 to 575 Volts, 190 Ohms (Two-Lead)	HL2598	12.45
Resistance Tube and Wire. For Resistances (HL2598, 5600)	HL2599	.90
Wire. For Resistances (HL2598, 5600) (per lb.)	HL599	2.80
Complete Resistance, 2 Amperes, 250 Volts, 70 Ohms (Two-Lead)	HL5600	9.10
Complete Resistance, 4 Amperes, 550 to 575 Volts, 117 and 170 Ohms (Three-Lead)	HL5601	16.00
Porcelain Tube. For Resistances (HL2117, 2115, 2119, 2598, 5600, 5601)	HL116	.40

Wiring Equipment Parts

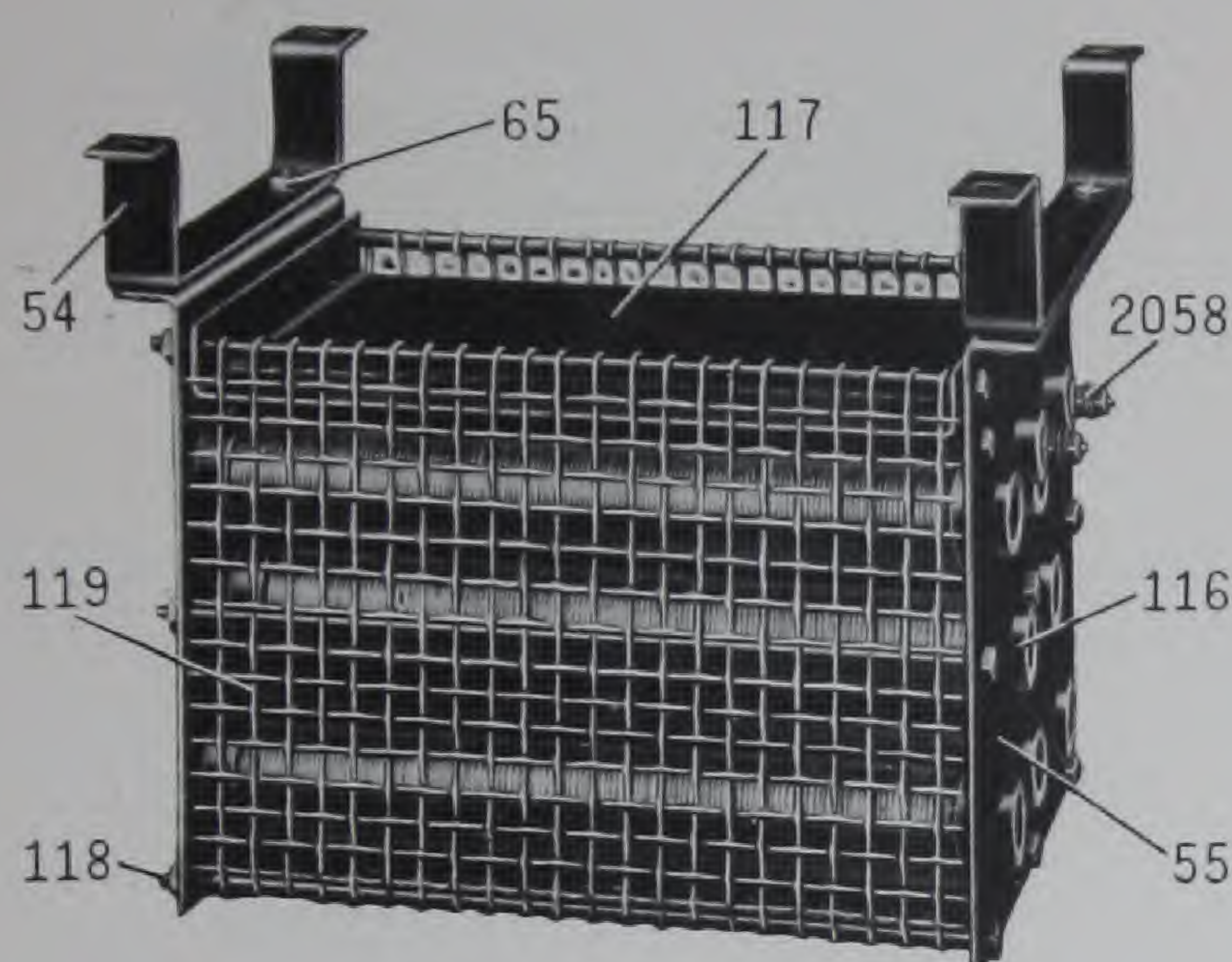
Single Plug Receptacle Complete	HL2105	\$.85
Porcelain Block. For Receptacle (HL2105)	HL105	.40
Double Plug Receptacle Complete	HL2141	1.70
Porcelain Block. For Receptacle (HL2141)	HL141	.80
Plug Receptacle Complete, less Porcelain Block. For HL2105 and HL2141	HL2108	.50
One-Way Snap Switch	HL110	1.15
Two-Way Snap Switch	HL140	2.30
Fuse Block, New Style (Standard). For N. E. C. Cartridge Fuse.	HL133	1.00
Fuse Block, Old Style. For Type A Cartridge Fuse	HL113	1.00
Fuse, 600 Volts, 6 Amperes. For Fuse Block (HL133)	HL134	.75
Fuse, 600 Volts, 6 Amperes—Type A. For Fuse Block (HL113)	HL114	.75
Dash Hanger, 9-inch (Old Style)	HL85	.30
Dash Hanger, 6-inch. For all Types of Portable Headlights	HL5161	.30

Resistance parts are listed on pages 70 and 71.

Crouse-Hinds multiple break switches are listed on page 69.

Resistance Parts

For Resistances Listed on Opposite Page



Main Resistance Part Number Drawing

Parts	Catalog Number	List Price
Fastening Bracket. For Resistances (HL2117, 2115, 2119, 2598, 5600) .	HL54	\$.35
Fastening Bracket. For Resistance (HL5601)	HL754	.40
Terminal Binding Post Complete, including Porcelain Bushing (HL136), Stud (HL58), Contact Washer (HL163), Contact Nut (HL165), Washer (HL51). For Resistances (HL2117, 2115, 2119, 2598, 5600, 5601) .	HL2058	.35
Porcelain Bushing. For Terminal Binding Post (HL2058)	HL136	.15
Stud. For Terminal Binding Post (HL2058)	HL58	.15
Contact Washer. For Terminal Binding Post (HL2058) . . (per dozen)	HL163	.40
Contact Nut. For Terminal Binding Post (HL2058) . . . (per dozen)	HL165	.70
Metal Washer. For Terminal Binding Post (HL2058) . . . (per dozen)	HL51	.30
Cover Plate. For Resistances (HL2117, 2115, 2119, 2598, 5600) . . .	HL117	.35
Cover Plate. For Resistance (HL5601)	HL756	.40
End Plate. For Resistances (HL2117, 2115, 2598)	HL55	.40
End Plate. For Resistances (HL2119, 5600)	HL2055	.40
End Plate. For Resistance (HL5601)	HL755	.50
Screen Covering. For Resistances (HL2117, 2115, 2598)	HL119	.42
Screen Covering. For Resistances (HL2119, 5600)	HL2056	.35
Screen Covering. For Resistance (HL5601)	HL759	.50
End Plate Connecting Bolt with Nut. For Resistances (HL2117, 2115, 2119, 2598, 5600, 5601)	HL118	.15
Bolt with Nut. For Fastening Resistance to Fastening Brackets (doz.)	HL65	.40

Crouse-Hinds Unit Resistance



Crouse-Hinds Removable Unit Resistance

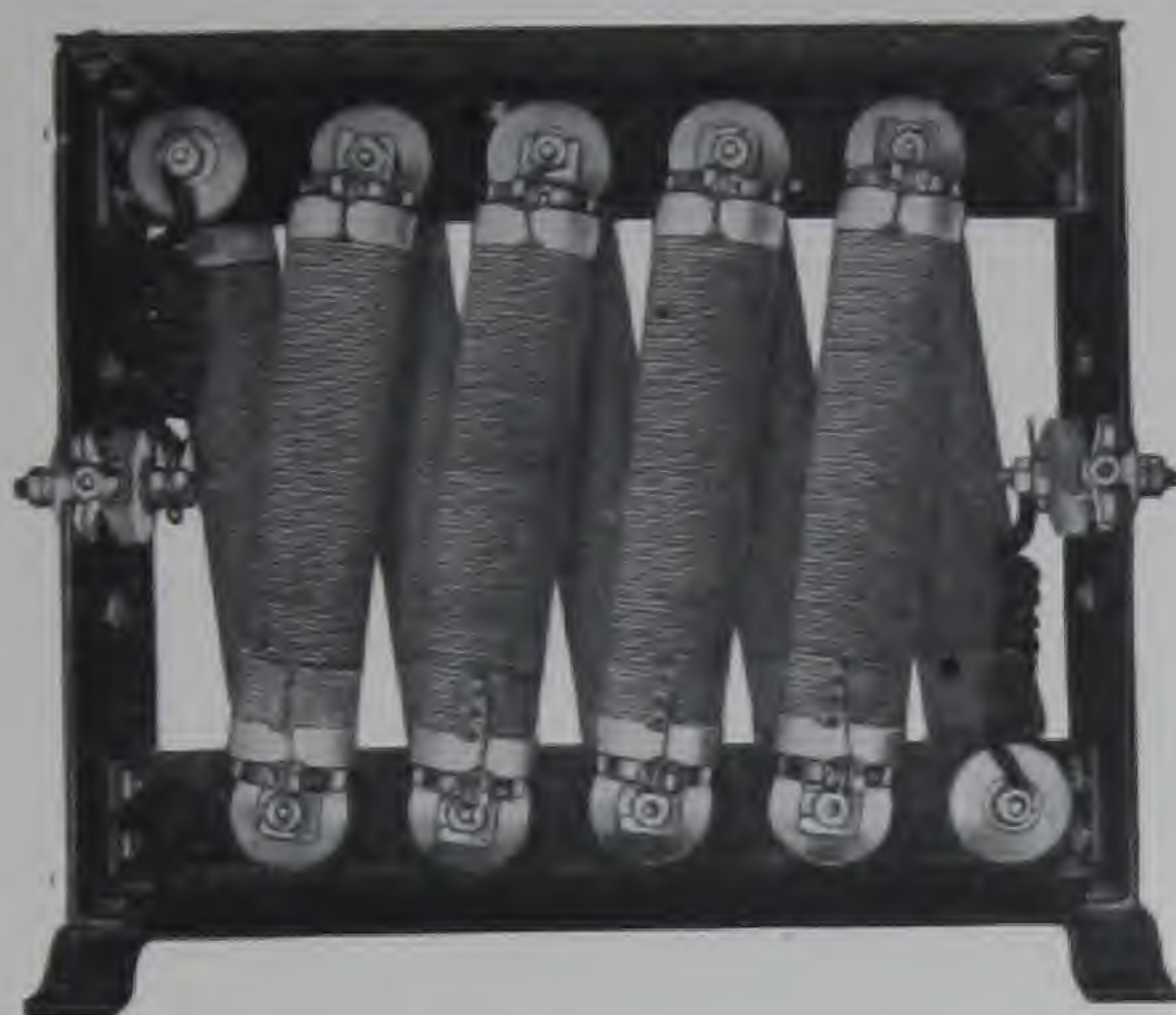
Resistance illustrated above embodies many new and improved features in the construction of headlight resistances. It consists of a sheet steel frame, removable side plates, hangers, resistance units and the various parts required to insure perfect insulation and circuit connections. Its design and construction is such that a damaged resistance unit can be replaced easily and quickly without removing the resistance from the car or disturbing any of the undamaged resistance units. This form of construction eliminates the possibility of damage to the resistance units through current leakage from resistance wire to the metal housing.

The resistance wire will not rust and is non-corrosive. It can be used in any climate without deterioration and is not affected by moisture. Furthermore, it will withstand extremely high temperature without oxidizing, scaling or becoming brittle.

The time involved in repairing is reduced to a minimum, as, after one or both of the side plates have been removed, the defective units are readily detected and new ones substituted, without taking the resistance apart. A unit is easily removed by loosening the connecting nuts that clamp it at each end.

Dimensions—Height, $11\frac{1}{2}$ inches; width, 11 inches; length, $17\frac{1}{2}$ inches; shipping dimensions, $23 \times 15\frac{1}{2} \times 16\frac{1}{2}$ inches.

Crouse-Hinds Unit Resistance—Continued

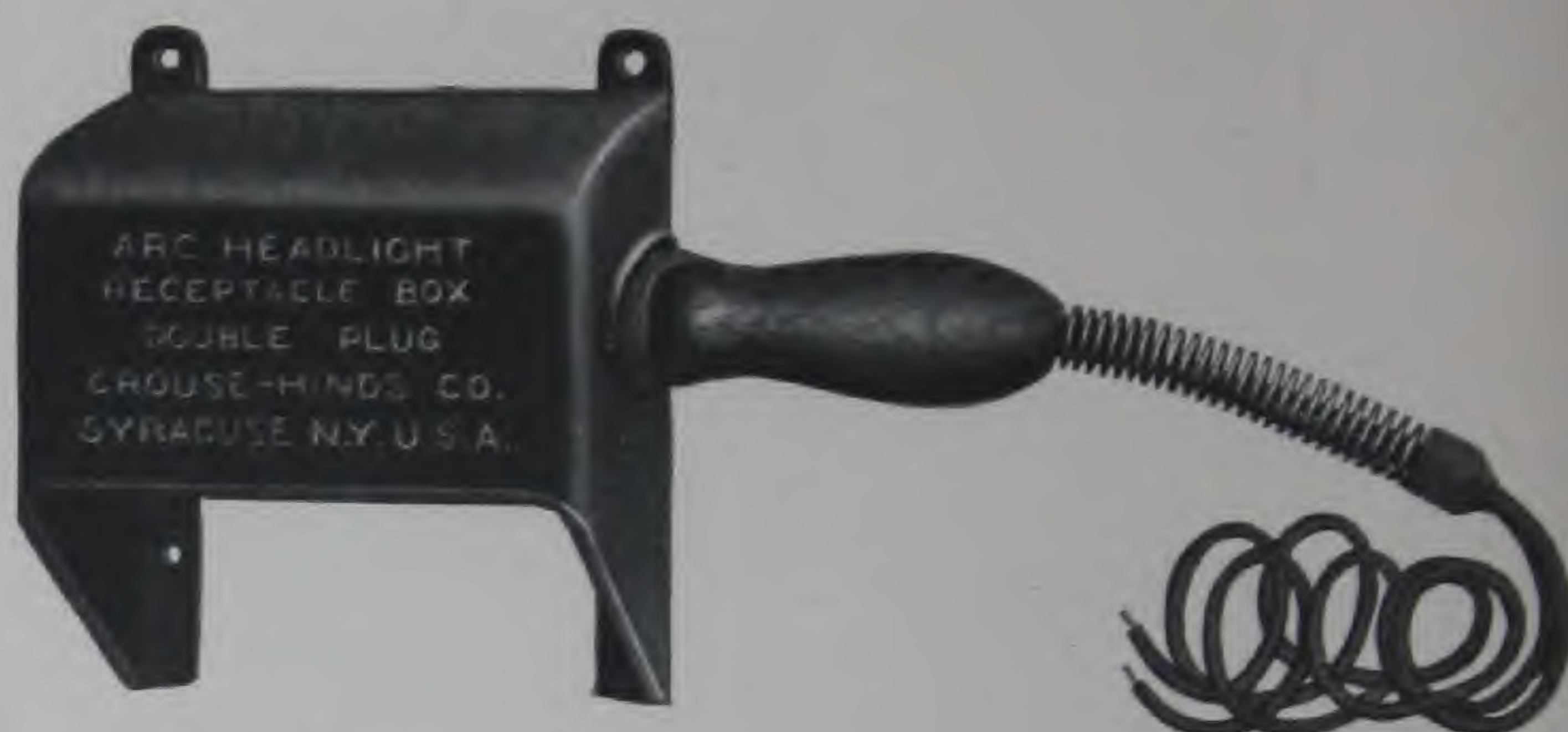


Crouse-Hinds Removable Unit Resistance with Side Plates Removed

Description	Catalog Number	List Price
Complete Resistance, 6 Amperes, 575 Volts, 78 Ohms	HL2790	\$24.00
Resistance Unit, including porcelain tube, wire and end terminals. For resistance HL2790	HL2791	2.70
Wire for Unit HL2791 (per pound)	HL2792	6.00
Complete Resistance, 5 Amperes, 575 Volts, 94 Ohms	HL2787	22.00
Resistance Unit, including porcelain tube, wire and end terminals. For resistance HL2787	HL2788	2.30
Wire for Unit HL2788 (per pound)	HL2789	6.25
Complete Resistance, 4 Amperes, 575 Volts, 117 Ohms	HL2784	20.00
Resistance Unit, including porcelain tube, wire and end terminals. For resistance HL2784	HL2785	1.90
Wire for Unit HL2785 (per pound)	HL2786	6.70
Complete Resistance, 4 Amperes, 250 Volts, 43 Ohms	HL2781	17.75
Resistance Unit, including porcelain tube, wire and end terminals. For resistance HL2781	HL2782	1.50
Wire for Unit HL2782 (per pound)	HL2783	2.40
Complete Resistance, 2½ Amperes, 575 Volts, 190 Ohms	HL2778	19.00
Resistance Unit, including porcelain tube, wire and end terminals. For resistance HL2778	HL2779	1.65
Wire for Unit HL2779 (per pound)	HL2780	7.30
Complete Resistance, 2½ Amperes, 250 Volts, 70 Ohms	HL2775	17.00
Resistance Unit, including porcelain tube, wire and end terminals. For resistance HL2775	HL2776	1.35
Wire for Unit HL2776 (per pound)	HL2777	2.40
Porcelain Tube. For above units	HL53	.45
Side Terminals with slot. For above units	HL2794	.35
End Terminals with slot. For above units	HL2795	.35
Terminal Stud with nuts, bushings and porcelain	HL2796	.40
Cover Plates	HL6674	.75
Locking Bolt	HL6675	.40
Wing Nut. For Locking Bolt	HL6676	.10
Box for Resistance complete, less cover plates	HL6677	2.50

Plugs, Receptacles and Boxes

For Single and Double Plug Receptacles



Plug Receptacle Box
Complete with Receptacle and Plug

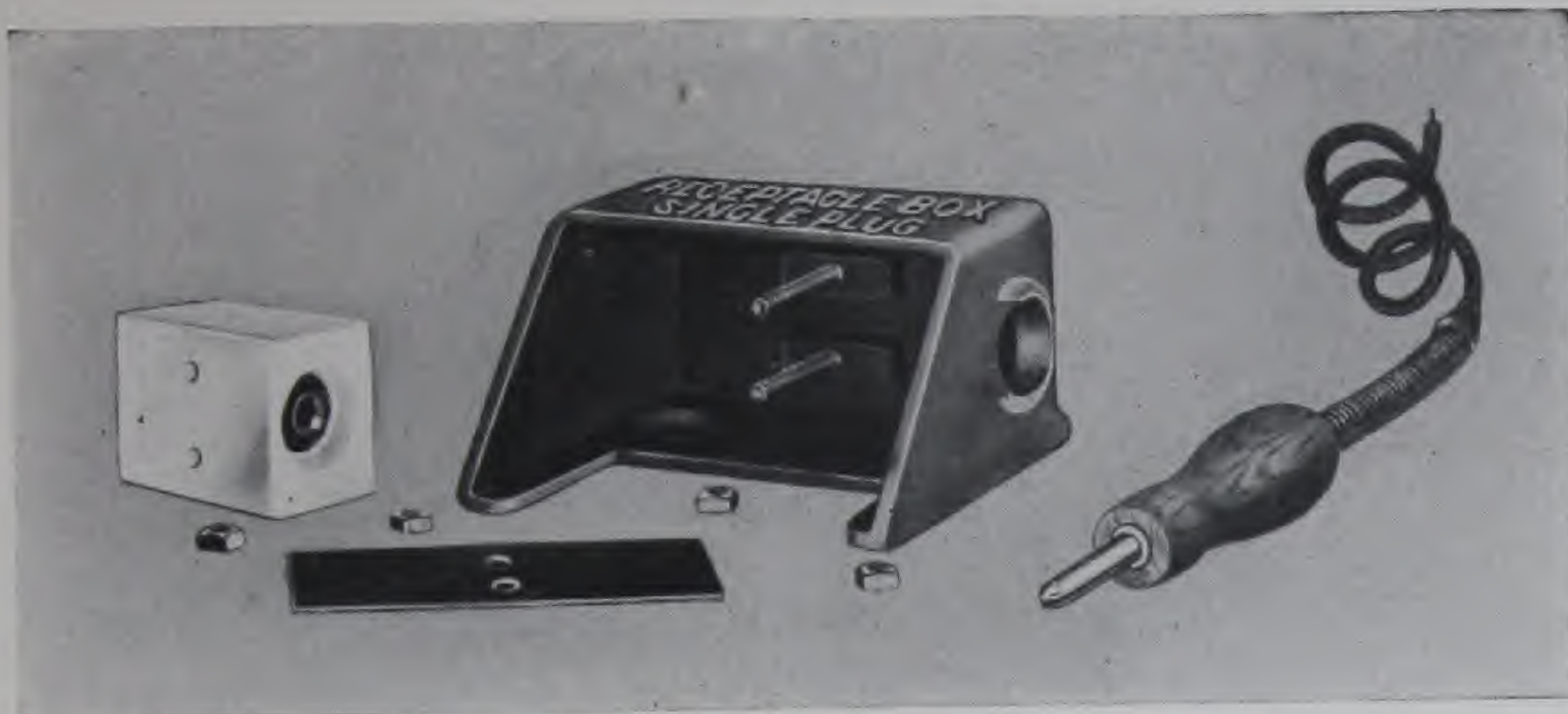
The Crouse-Hinds Receptacle Boxes for single and double plug receptacles, illustrated on this and the opposite page, are so designed as to protect the installed receptacle from the weather and damage.

These boxes can be bolted directly on the front of the dash, away from the splashing of mud and water, which may cause leakage in the circuit. Other points of superiority of this Crouse-Hinds product over the ordinary plugging-in box for headlights will immediately be apparent upon reading the following description. The box is a one-piece iron casting of sufficient strength to withstand any knock, except such as would wreck the end of the car. Having a sloping top and straight sides, water can not lodge anywhere on the box, nor can it get to the interior through the plug opening in the end, as this opening is protected by a ledge or ridge.

Two studs, with their heads firmly embedded in the iron during the process of casting, project downward from the inner top of the box. They fit the holes through the porcelain block and also pierce a sheet steel plate that completely closes the bottom opening in the box. Lock nuts on the lower ends of the studs lock the box, porcelain and plate together beyond possibility of working loose. Current carrying wires enter the box through a hole in the back and through a corresponding hole in the dash.

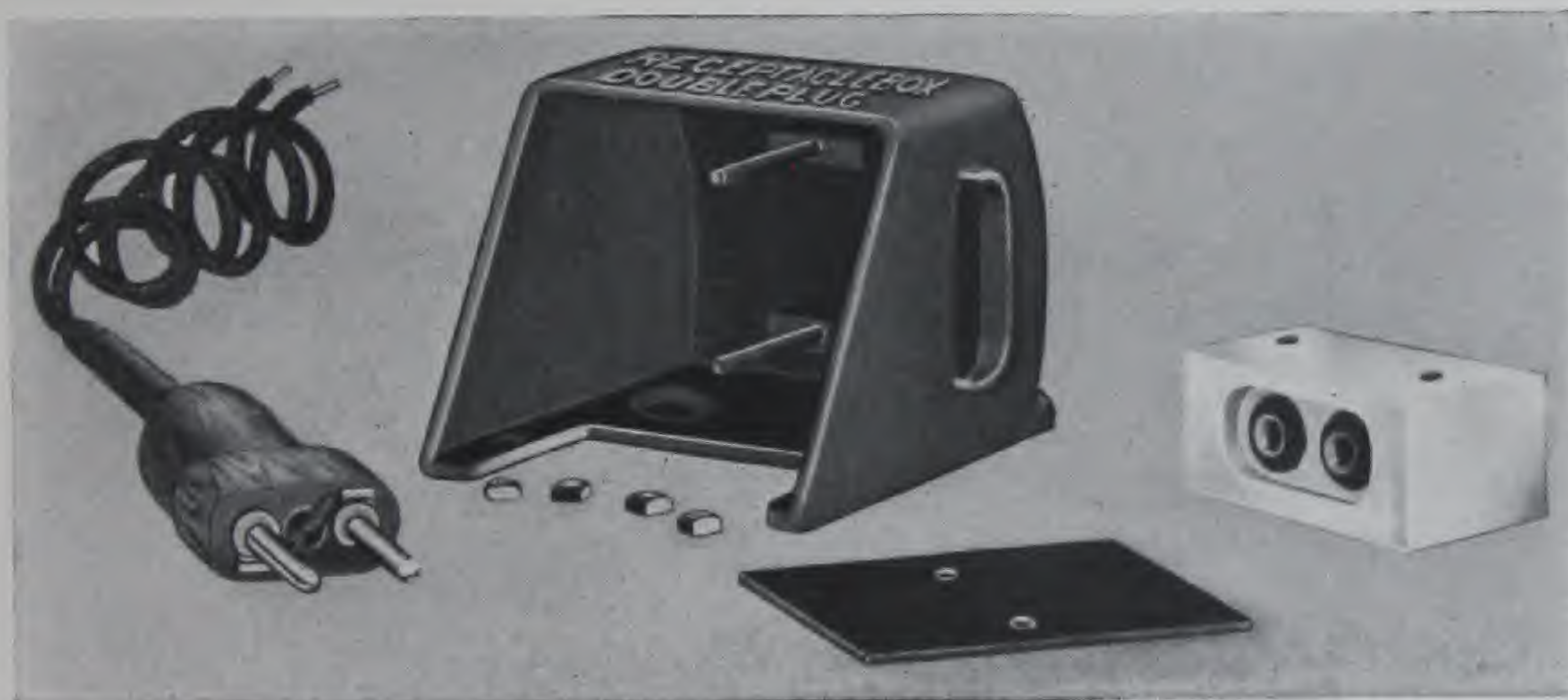
Plugs, Receptacles and Boxes

For Single and Double Plug Receptacles



Single Plug Receptacle Box Complete, Unassembled

Catalog number does not include plug shown in above illustration.



Double Plug Receptacle Box Complete, Unassembled

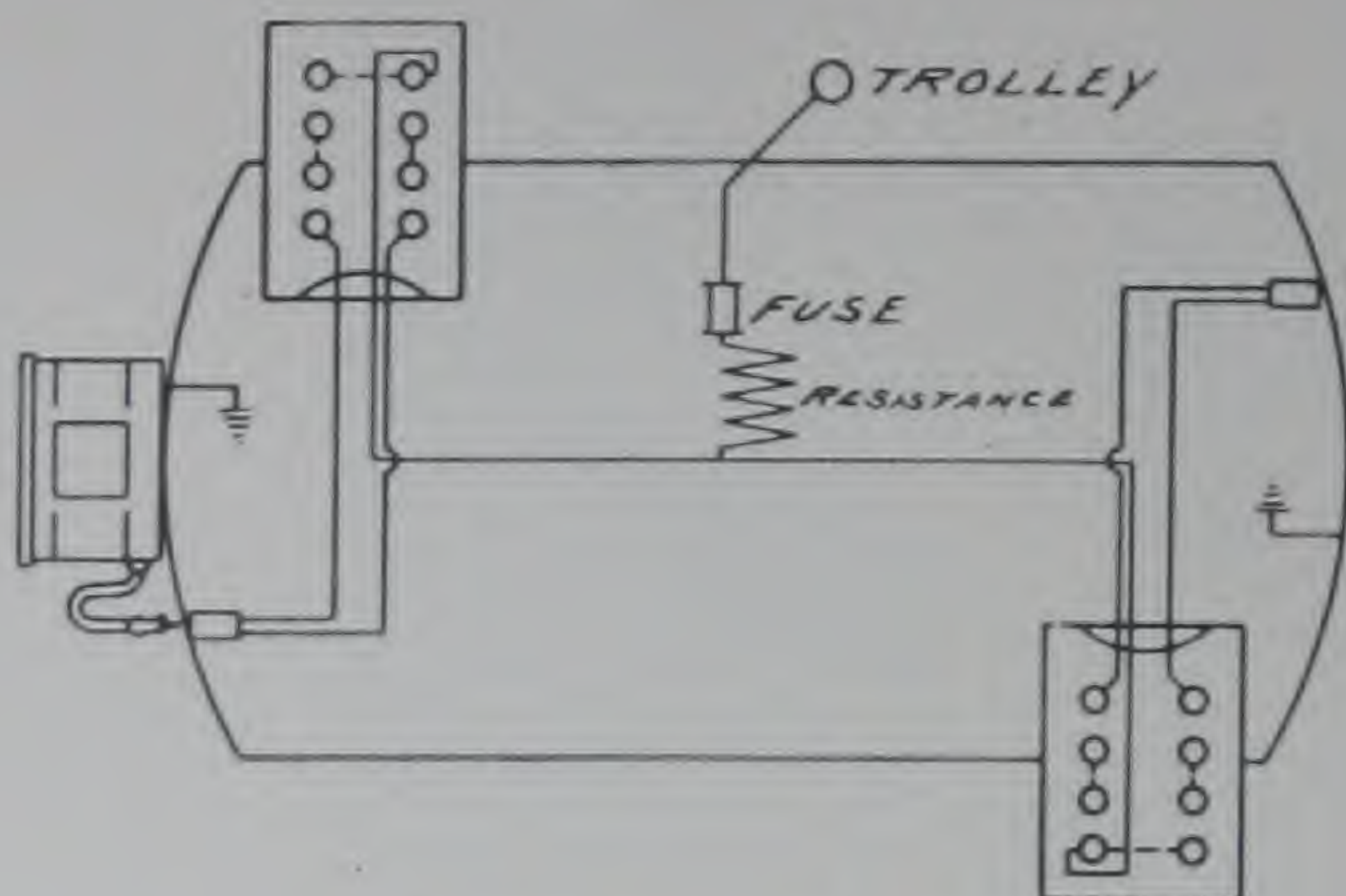
Catalog number does not include plug shown in above illustration.

Listings of Crouse-Hinds Arc Headlight Plugs, Receptacles and Boxes

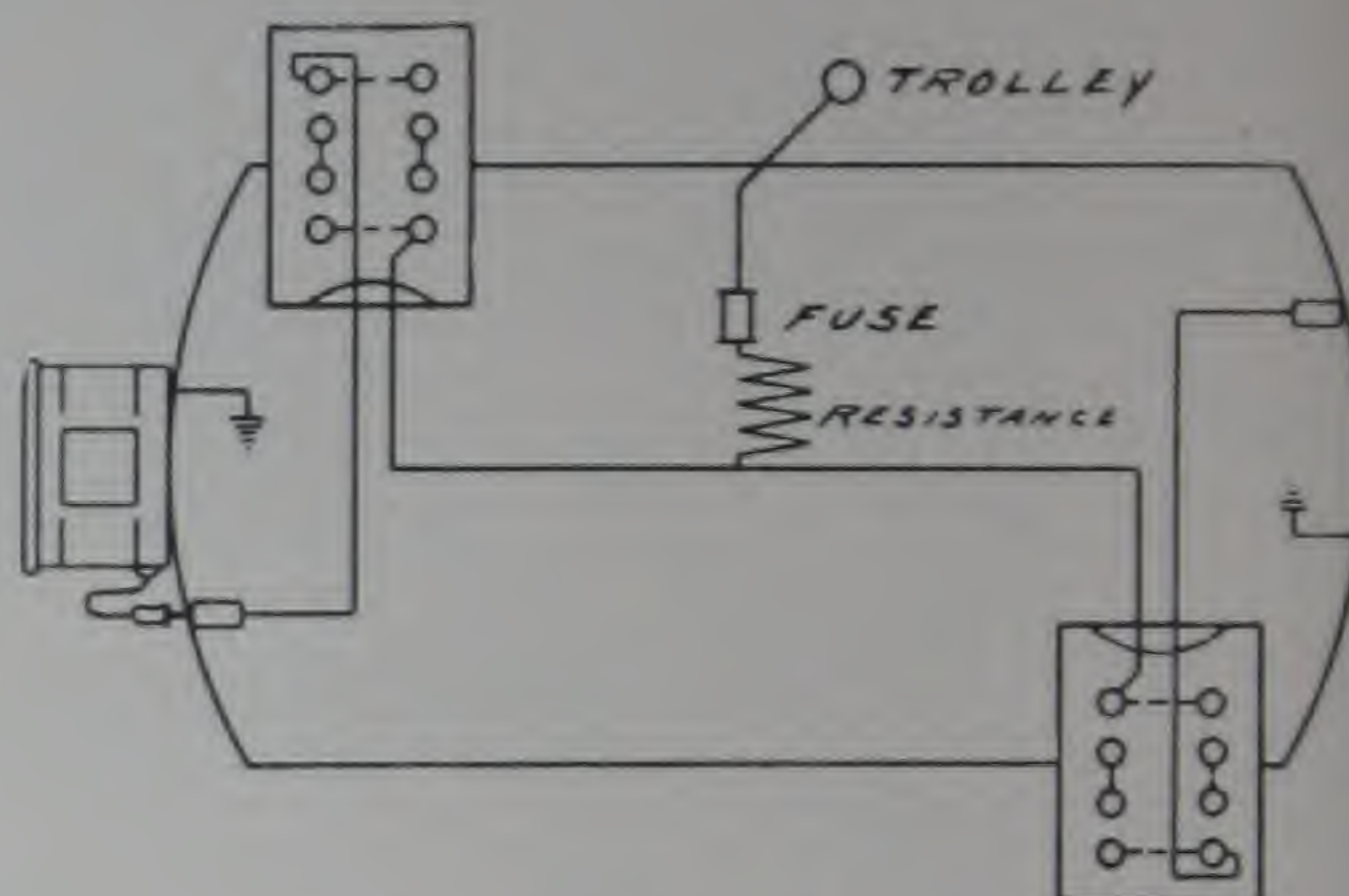
Description	Catalog Number	List Price Each
Box complete with Single Plug Receptacle, but without Plug . . .	25501	\$2.35
Box complete with Double Plug Receptacle, but without Plug . .	25502	3.45
Single Plug with Five Feet of Cable	HL2103	1.60
Double Plug with Five Feet of Cable	HL2137	2.30
Single Plug Receptacle	HL2105	.85
Double Plug Receptacle	HL2141	1.70
Porcelain Block for HL2105	HL105	.40
Porcelain Block for HL2141	HL141	.80
Plug Receptacle less Porcelain Block for HL2105 and 2141 . . .	HL2108	.50
Box only. For Single Plug Receptacle	25503	1.50
Box only. For Double Plug Receptacle	25504	1.75

Wiring Diagrams

For Electric Traction Headlights



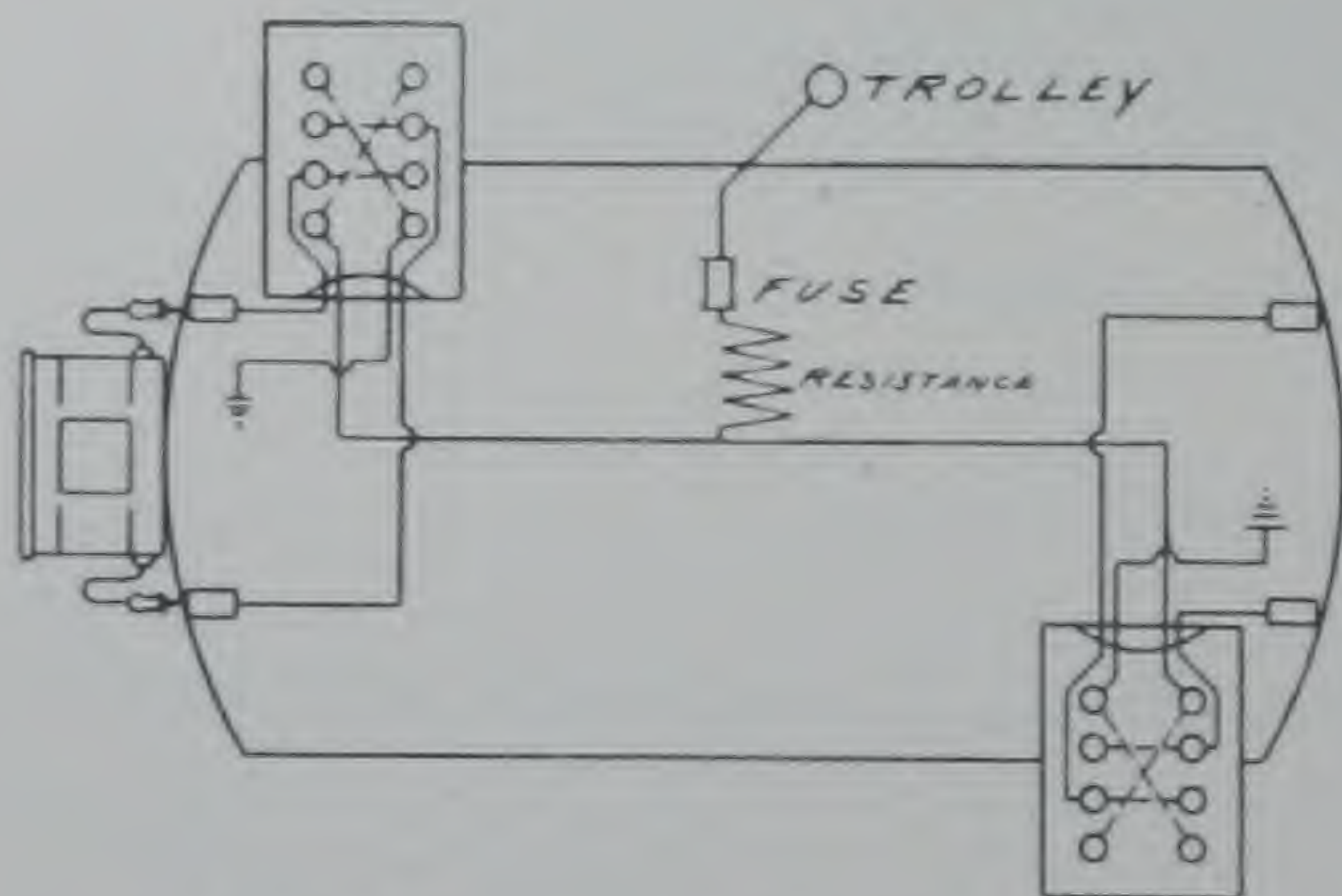
Wiring Diagram No. 1
For Types LAA, LCA, LGA, A, C, H, K, P and Q Headlights
with Double End Equipment*



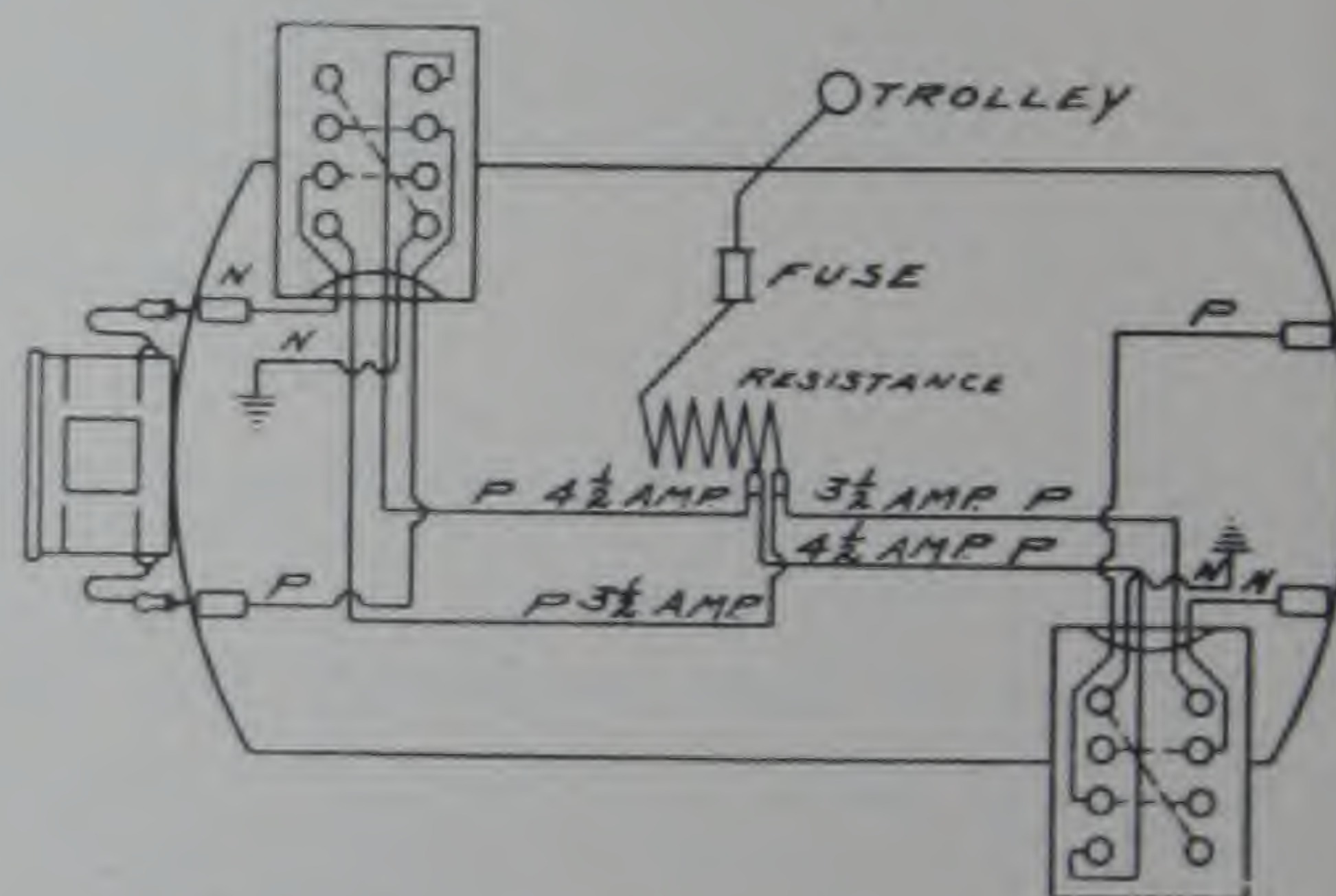
Wiring Diagram No. 2
For Types LBA, LDA, LHA, LK, LP, B, D, J, L and V Head-
lights with Double End Equipment*

Wiring equipments for types A, C, H, K, P and Q carbon arc headlights include two-way snap switches; whereas, wiring equipments for types LAA, LCA and LGA luminous arc headlights include two-way multiple break switches. Wiring diagram No. 1 shows two-way multiple break switch.

Wiring equipments for types B, D, J, L and V carbon arc headlights and (2-ampere) LK and (2-ampere) LP luminous arc headlights include one-way snap switches; whereas, wiring equipments for types LBA, LDA and LHA luminous arc headlights include one-way multiple break switches. Wiring diagram No. 2 shows one-way multiple break switches.



Wiring Diagram No. 3—Metallic Circuit
For Types LBA, LDA and LHA Headlights
with Reversing Switch as a Part of
Double End Equipment*



Wiring Diagram No. 4—Metallic Circuit
For Types LBA, LDA and LHA Headlights
with Reversing Switch and Three-Lead Main Resist-
ance as a Part of Double End Equipment*

*Wiring diagrams for above headlights with single end equipments are represented by above diagrams with one end omitted.

Wiring Diagrams—Continued

For Electric Traction Headlight, 1200 Volts

On the following page there are three typical connection diagrams for headlights on straight 1200-volt and on 1200-600-volt cars. It is impossible to give more than schematic diagrams, because 1200-volt car wiring varies considerably. This is particularly true where cars are for both 1200-volt and 600-volt operation.

When 1200-volt cars are equipped with a dynamotor to give 600 volts, the headlight presents a simple proposition, because an ordinary 600-volt headlight equipment is used.

In cases where there are no dynamotors and the headlights must operate entirely on 1200 volts, headlight switches must be of sufficient capacity to take care of this high voltage. This usually means quick-make and break switches, equipped with magnetic blow-out coils.

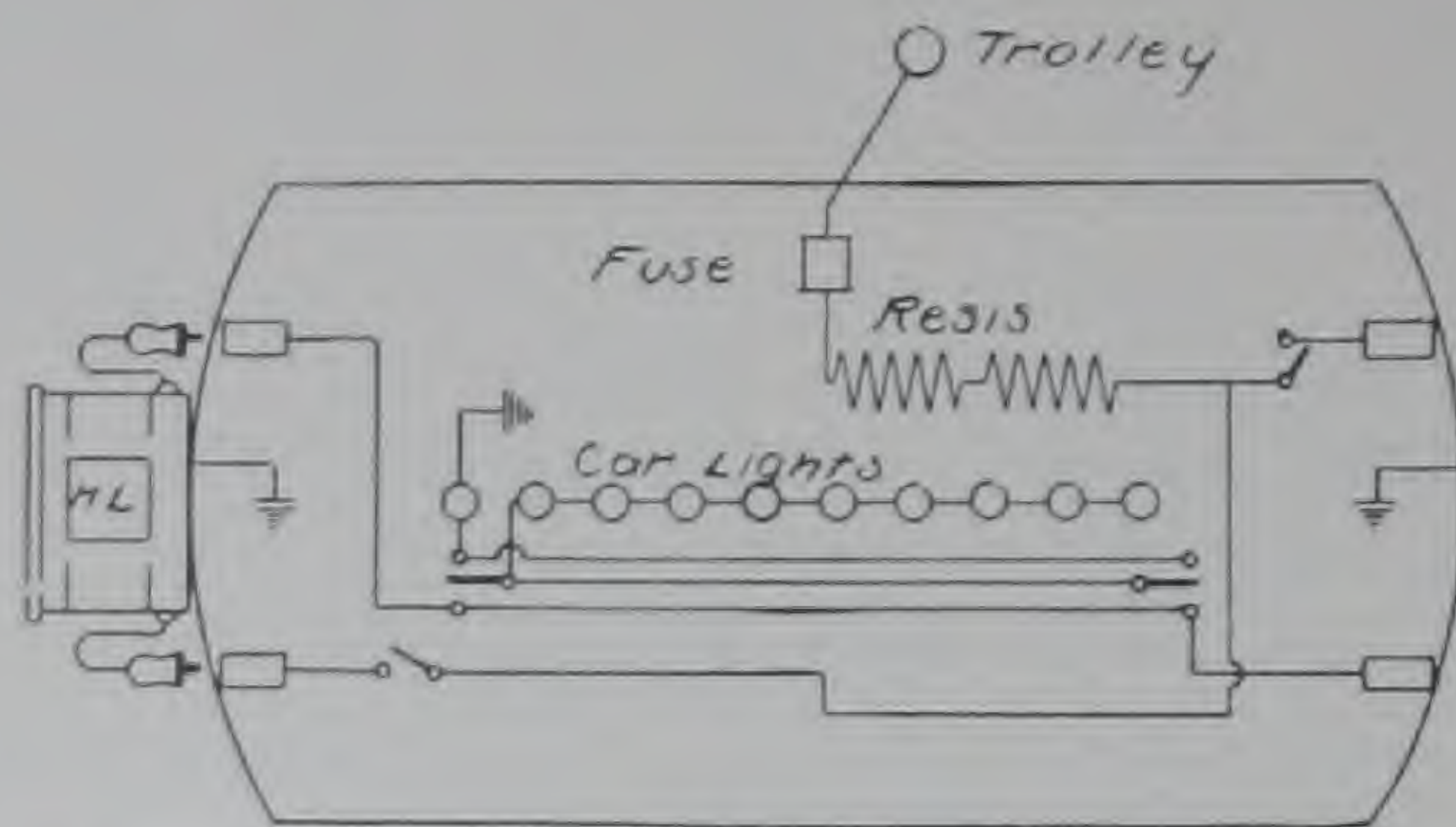
Where straight 1200-volt cars come into the city and have to operate on a 600-volt trolley circuit, the cars are equipped with either a commutating switch or some other form of master switch, one function of which is to short-circuit half the main resistance in the headlight circuit, so that the headlight may burn both normally and dimmed on this voltage.

Under certain conditions a headlight is desired which is equipped with an auxiliary incandescent lamp for dimming operation. The common 600-volt practice of mounting a resistance with the headlight casing to take care of this lamp cannot be followed on 1200-volt circuits, because there is not sufficient space in the casing to insulate properly the resistance from the casing. Therefore, when an incandescent lamp circuit is desired, the necessary resistance must be outside the headlight casing; a circuit of car-lights may be used for this resistance.

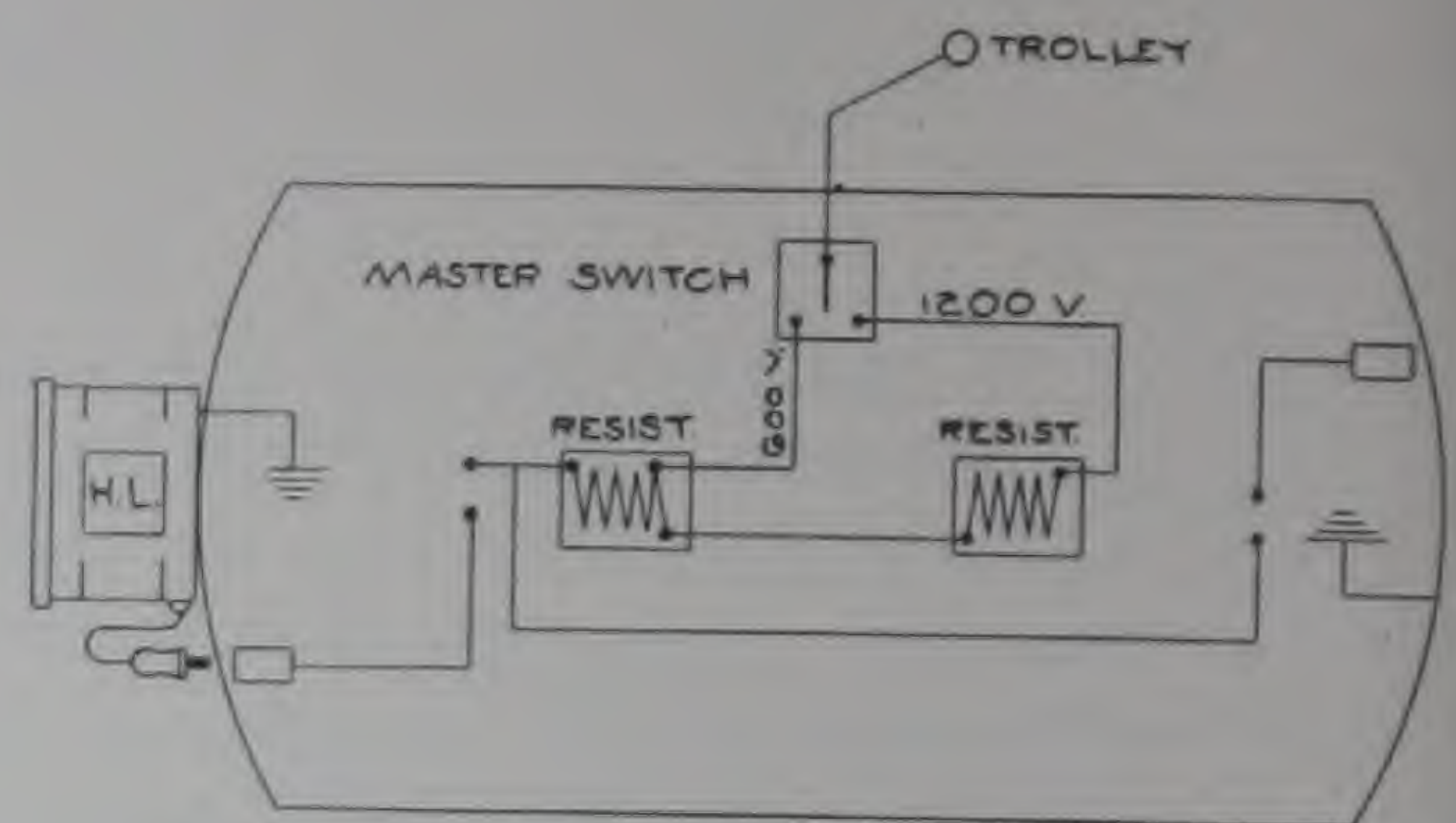
The following three diagrams will give an idea of the possibilities of wiring the headlight circuit. The Crouse-Hinds Company will co-operate with any of its customers in working out the details for any particular conditions which are not covered by one of these three diagrams.

Wiring Diagrams—Continued

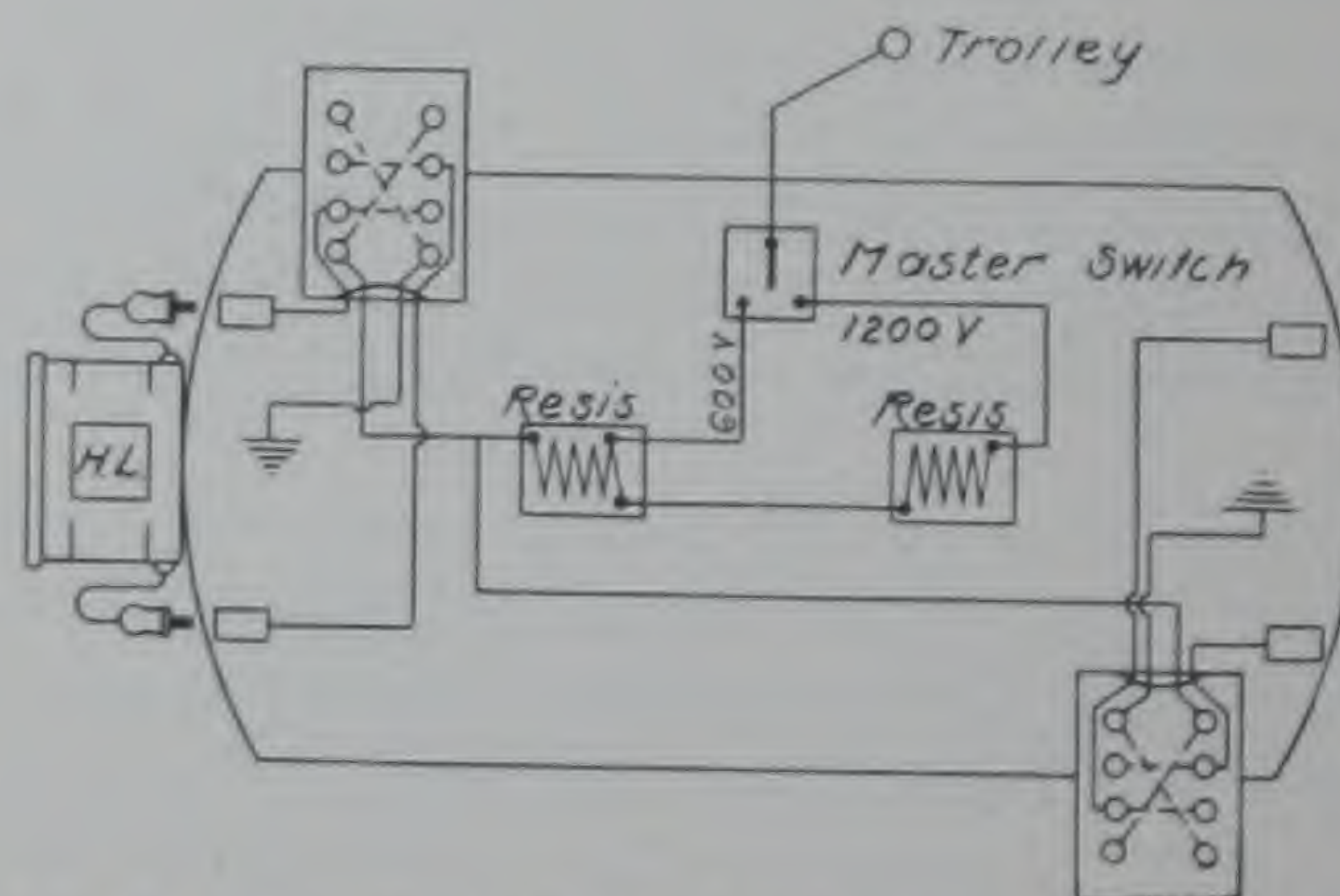
For Electric Traction Headlights, 1200 Volts



Wiring Diagram for 1200-Volt Luminous Arc Headlight Equipped with One Incandescent Lamp for Dimming, Operated in Series with Car Light or Other External Resistance



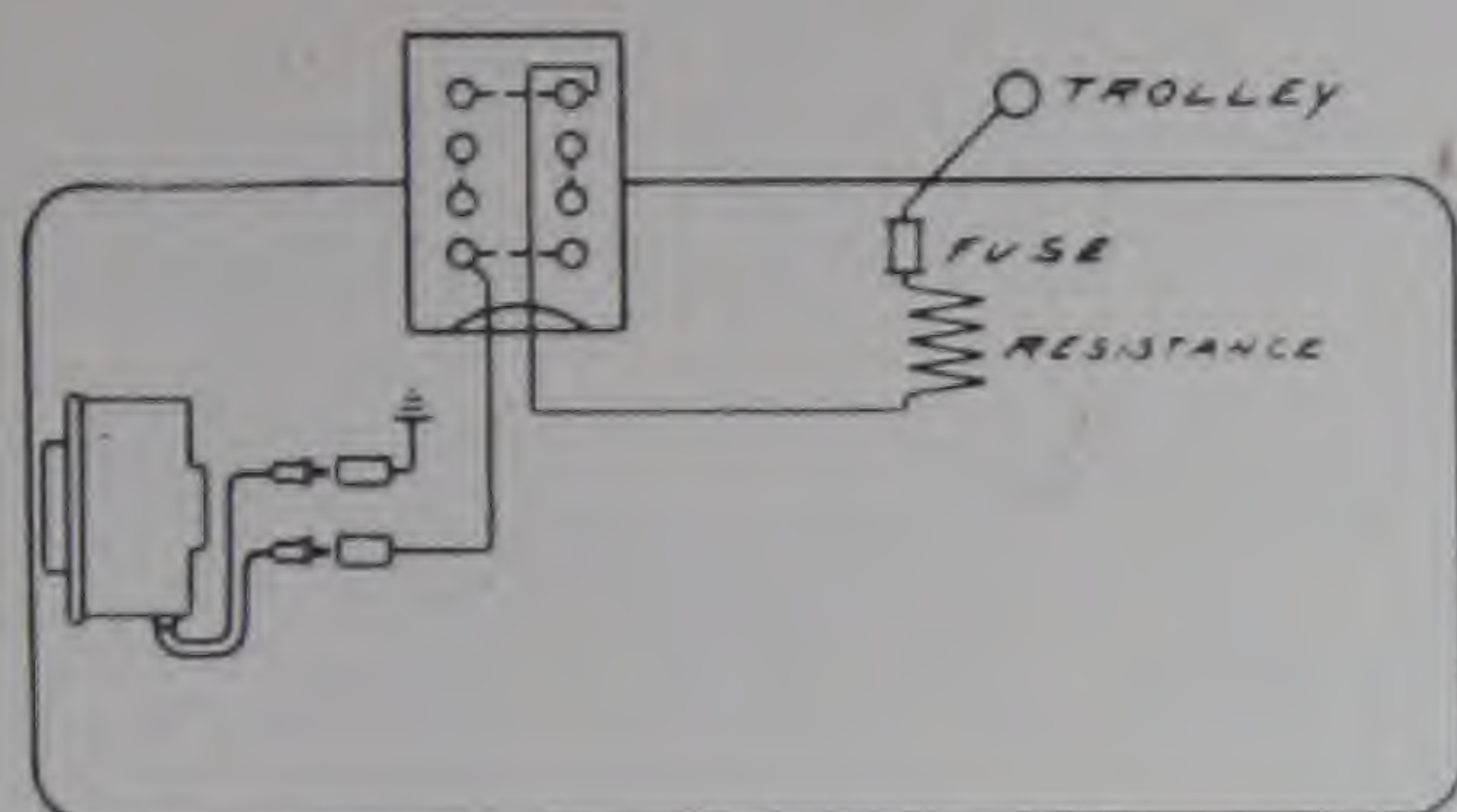
Wiring Diagram for Luminous Arc Headlight on 1200/600-Volt System



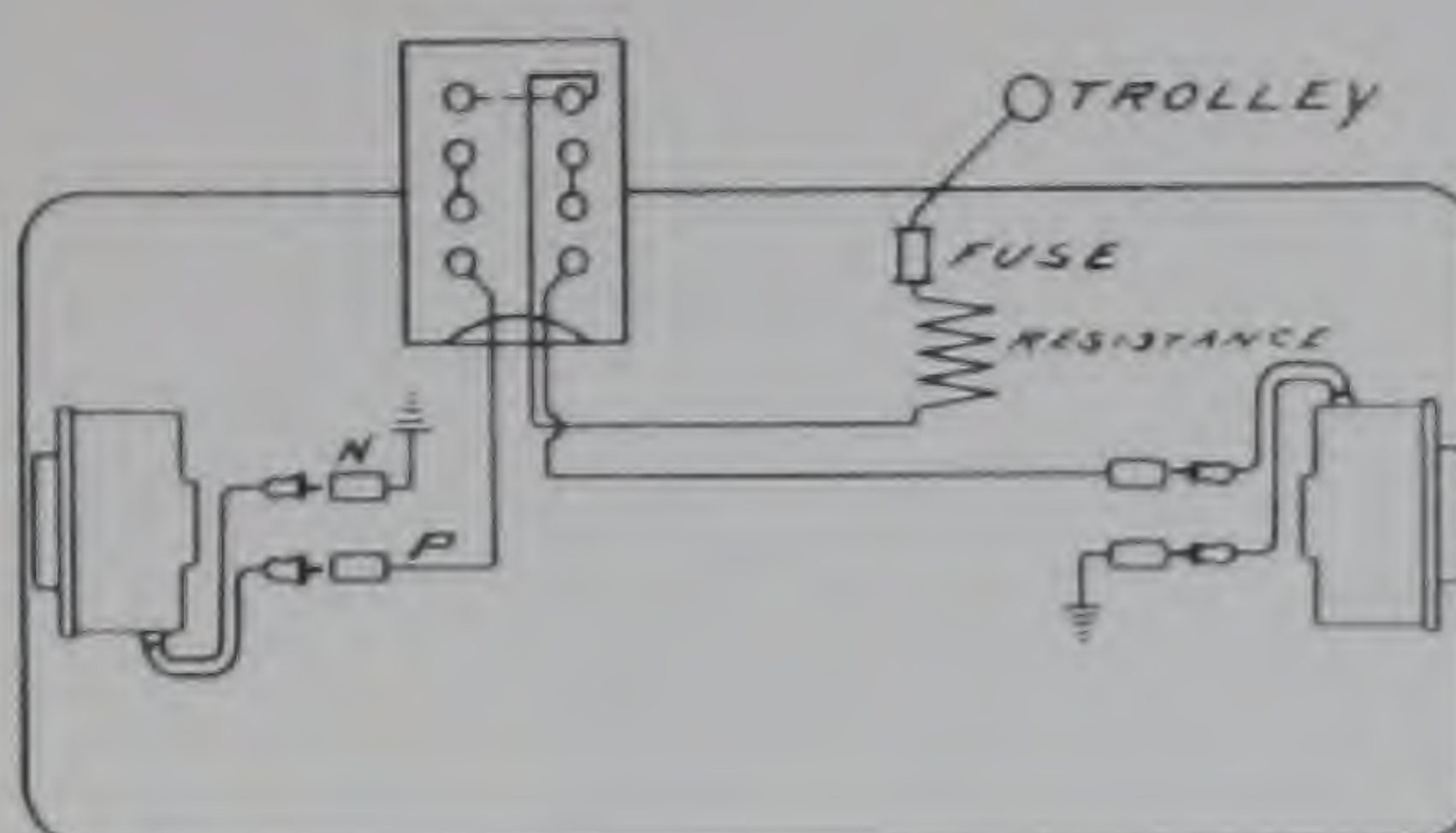
Wiring Diagram for 1200/600-Volt Luminous Arc Headlight Reversed Polarity Dimming

Wiring Diagrams—Continued

For Electric Mine Locomotive Headlights



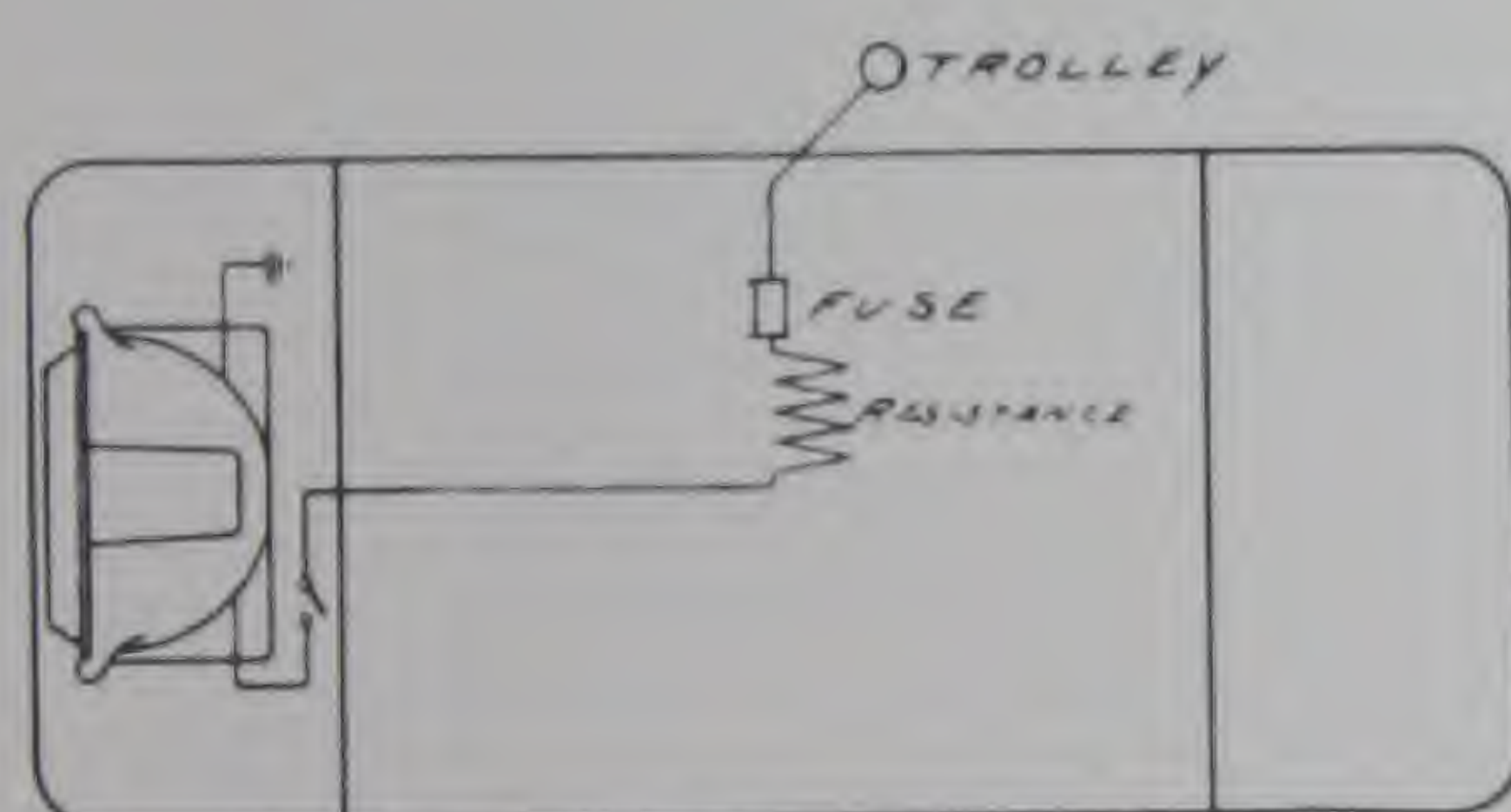
Wiring Diagram No. 1
For Types ML, MLF, MLD and MLK Headlights
with Single End Equipment



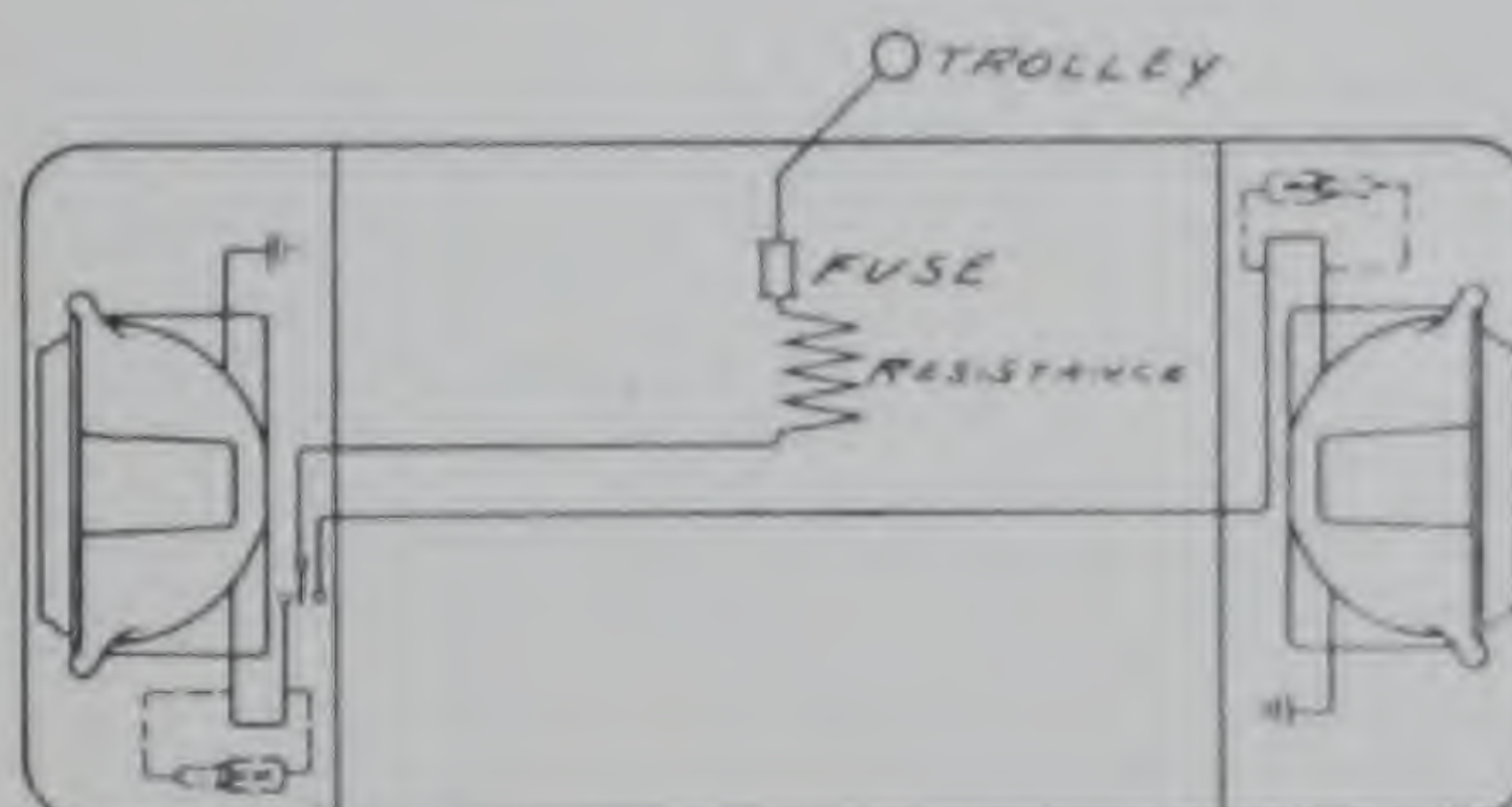
Wiring Diagram No. 2
For Types ML, MLF, MLD and MLK Headlights
with Double End Equipment

Single end wiring equipment for type MLK luminous arc headlight includes one-way snap switch; whereas, single end wiring equipments for types ML, MLF and MLD luminous arc headlights include one-way multiple break switch. Wiring diagram No. 1 shows one-way multiple break switch.

Double end wiring equipment for type MLK luminous arc headlight includes two-way snap switch; whereas, double end wiring equipment for types ML, MLF and MLD luminous arc headlights include two-way multiple break switch. Wiring diagram No. 2 shows two-way multiple break switch.



Wiring Diagram No. 3
For Types M, V (when used on Mine Locomotives) and VR Headlights with
Single End Equipment



Wiring Diagram No. 4
For Types M, V (when used on Mine Locomotives) and VR Headlights with
Double End Equipment

Single end wiring equipments for types M, V and VR carbon arc headlights include one-way snap switch.

Double end wiring equipments for types M, V (when used on mine locomotives) and VR carbon arc headlights include two-way snap switch.

Dimensional Diagrams

For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP, LXA, A, B, C, D, H, J, K, L, P and Q Headlights

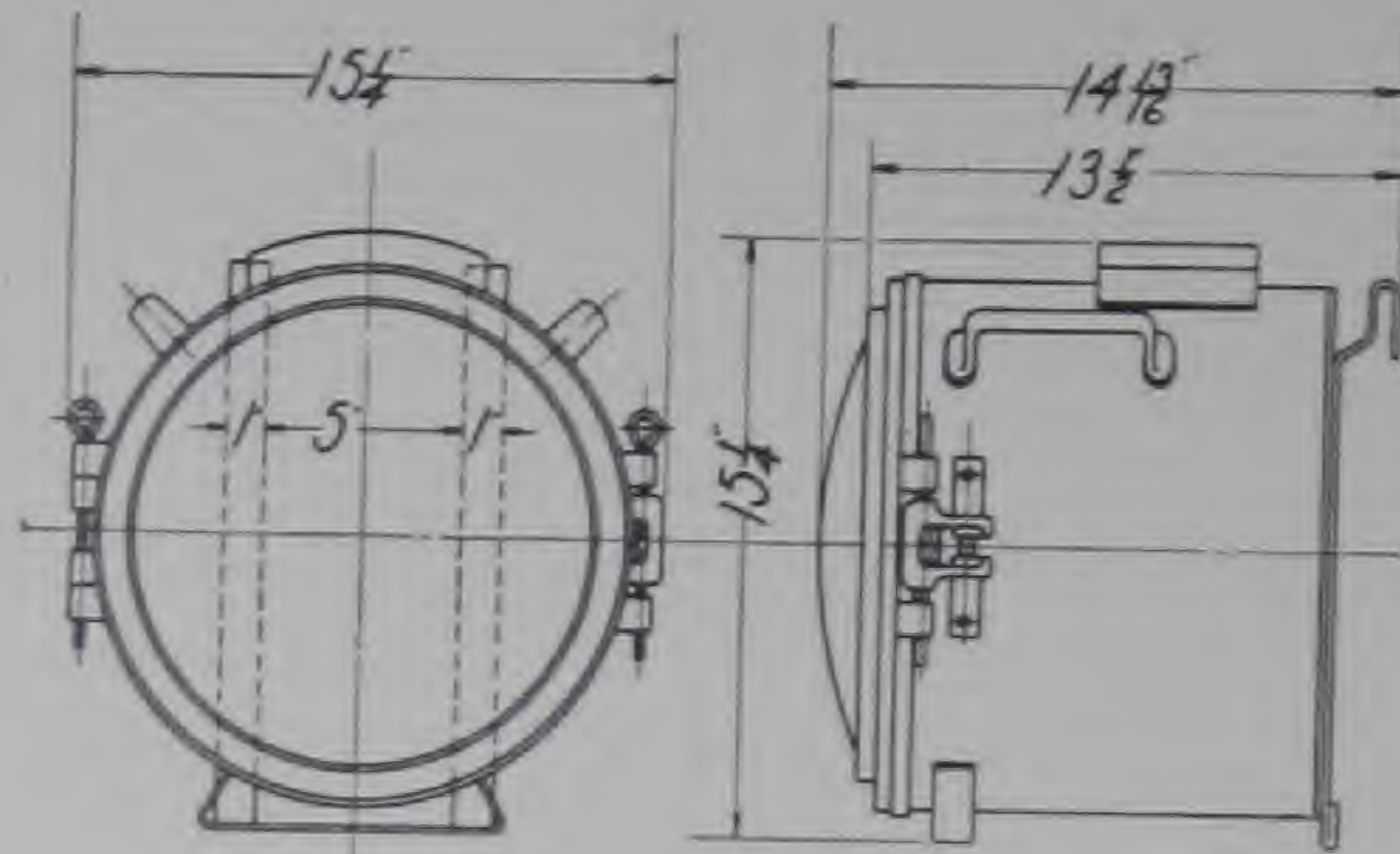


Diagram No. 1
Types LAA, LBA, LCA and LDA

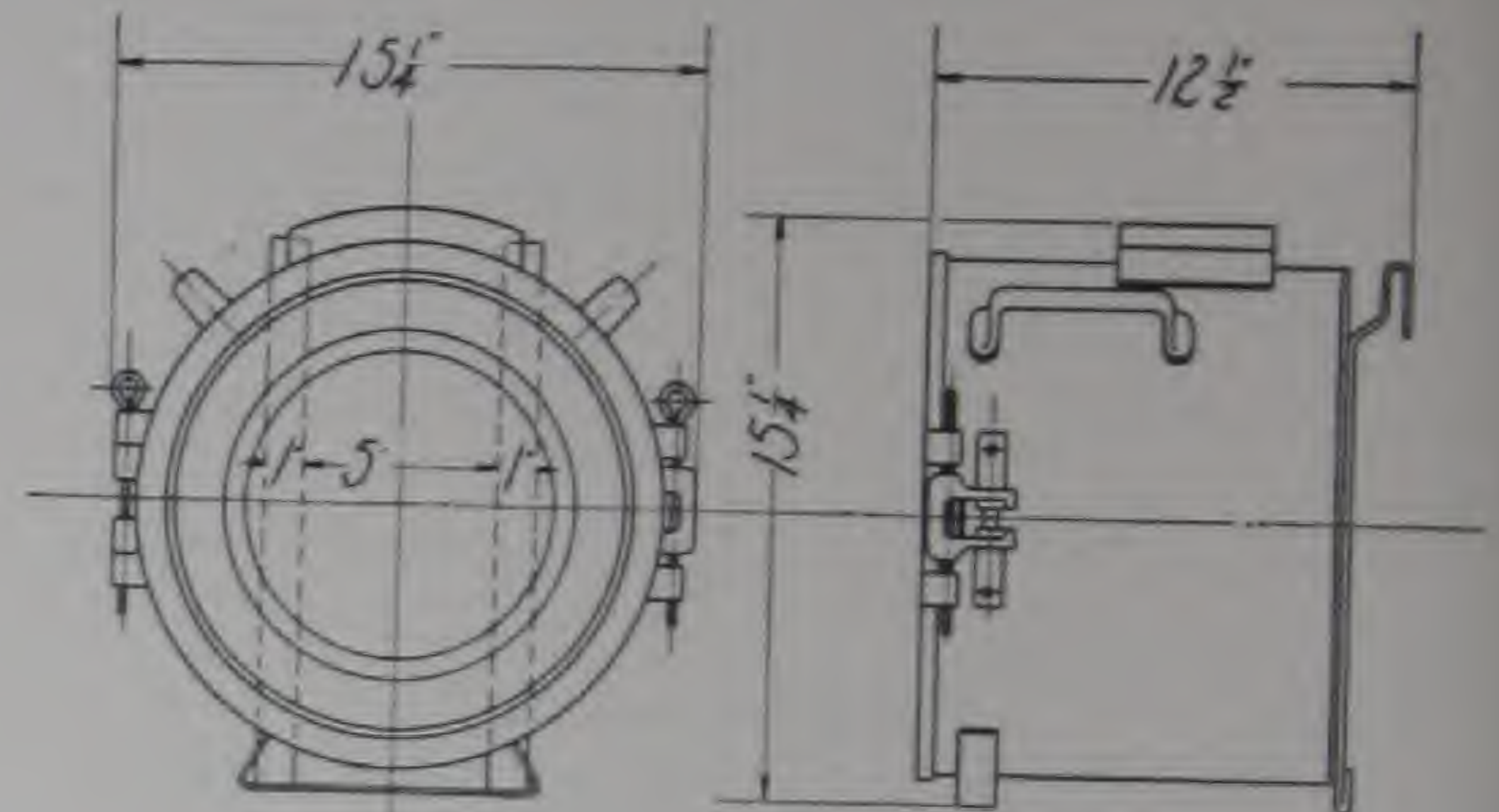


Diagram No. 2
Types LGA and LHA

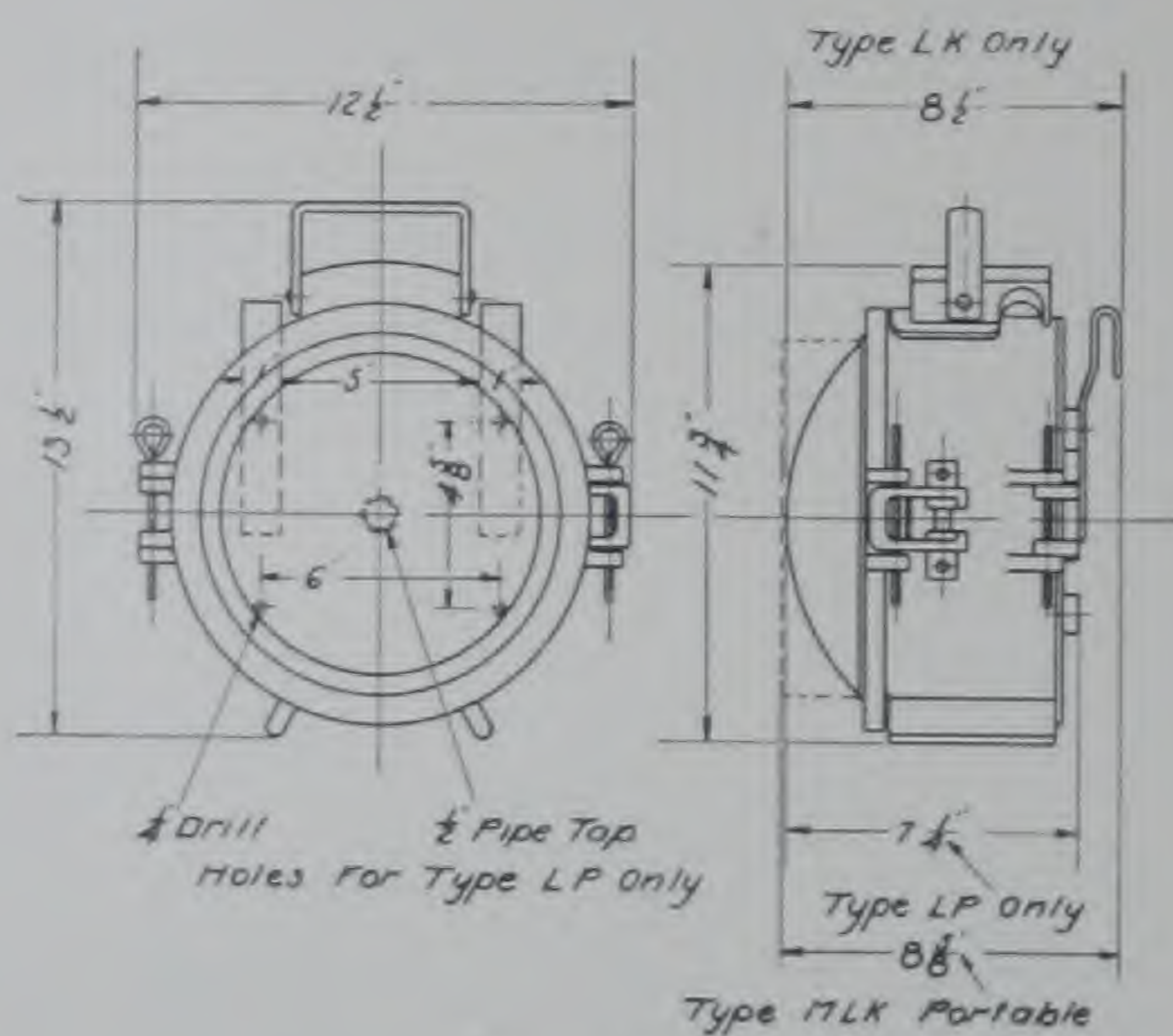


Diagram No. 3
Types LK, MLK Portable and LP

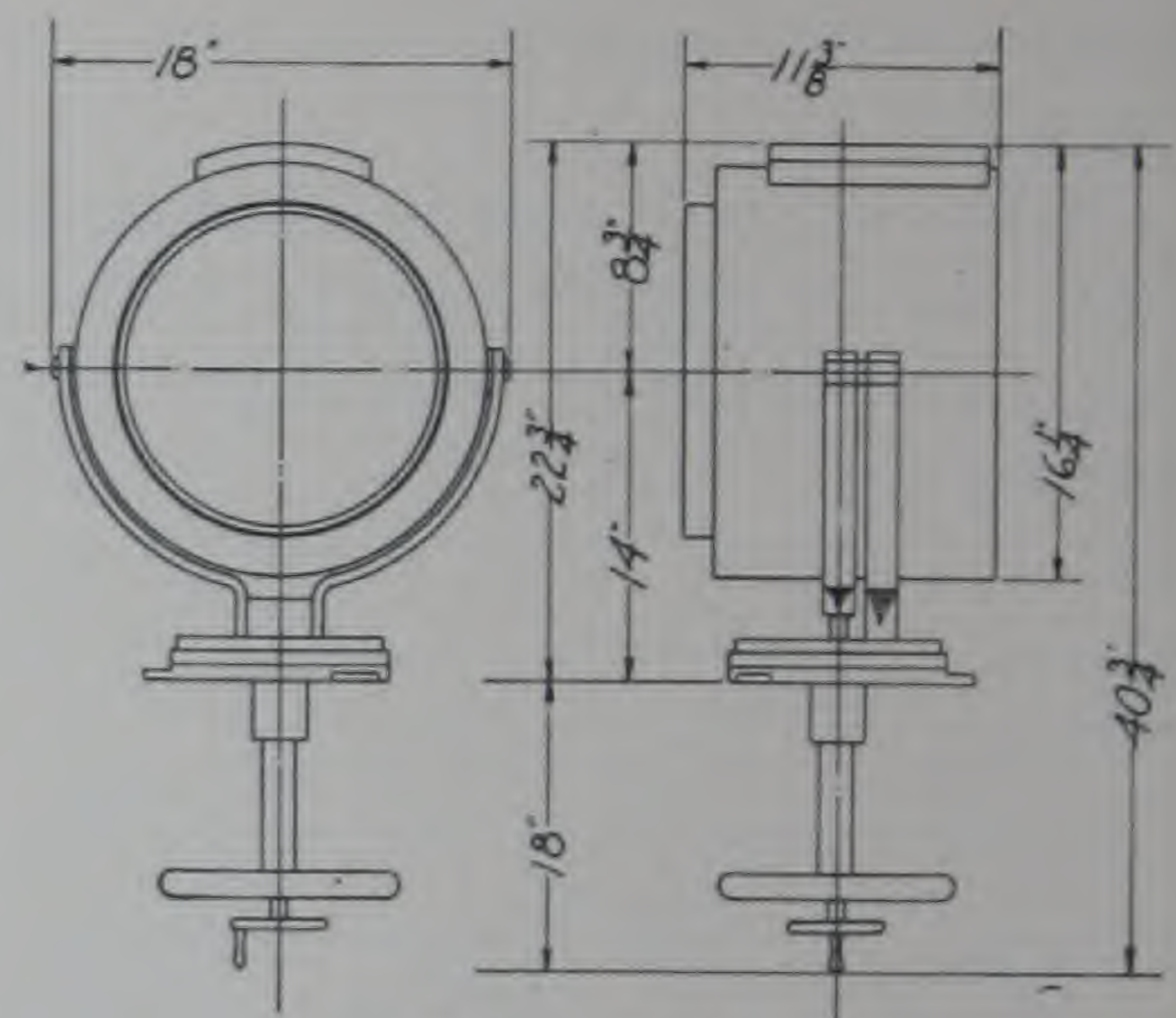


Diagram No. 4
Type LXA

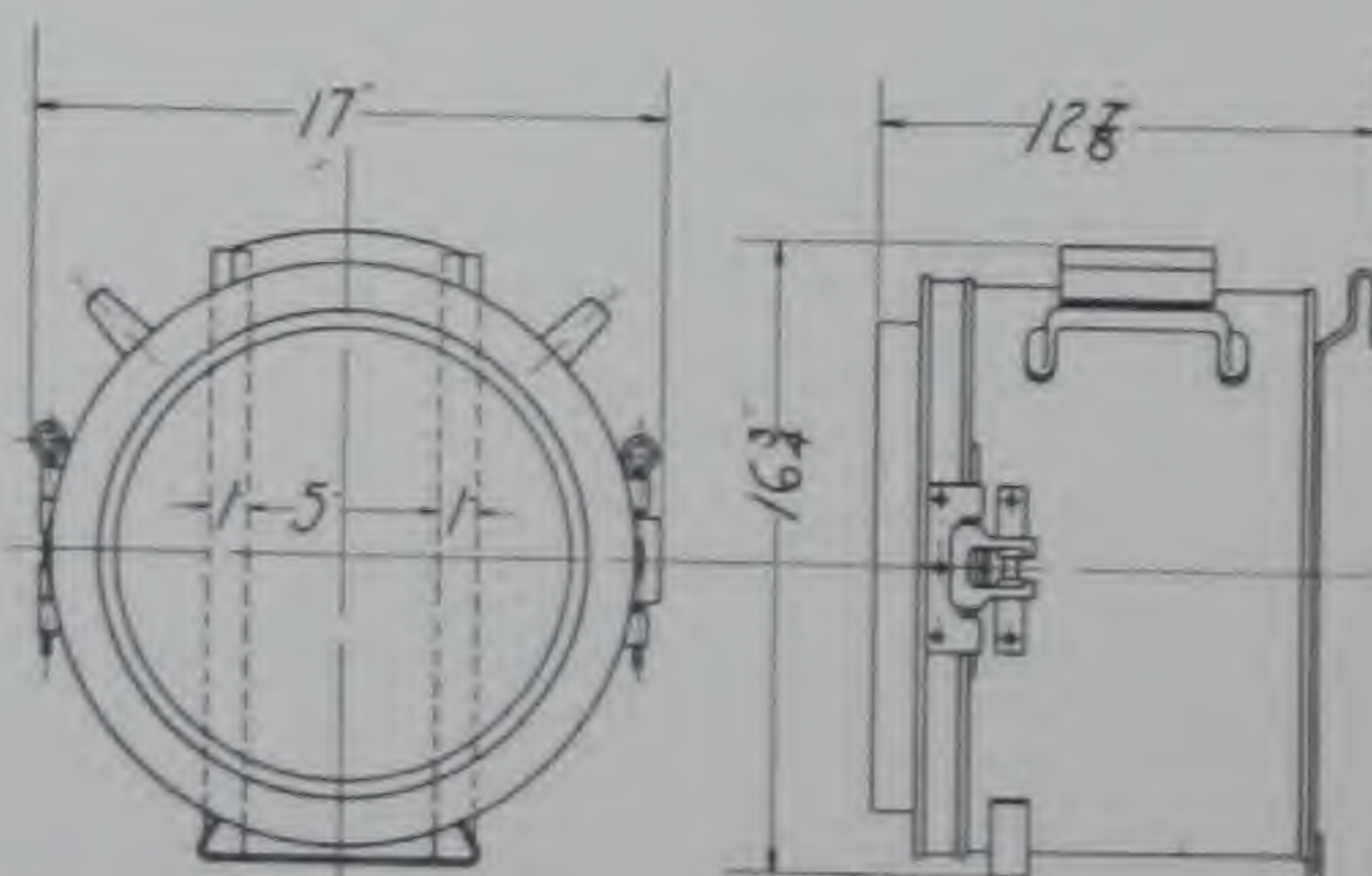


Diagram No. 5
Types A, B, H, J, P and Q

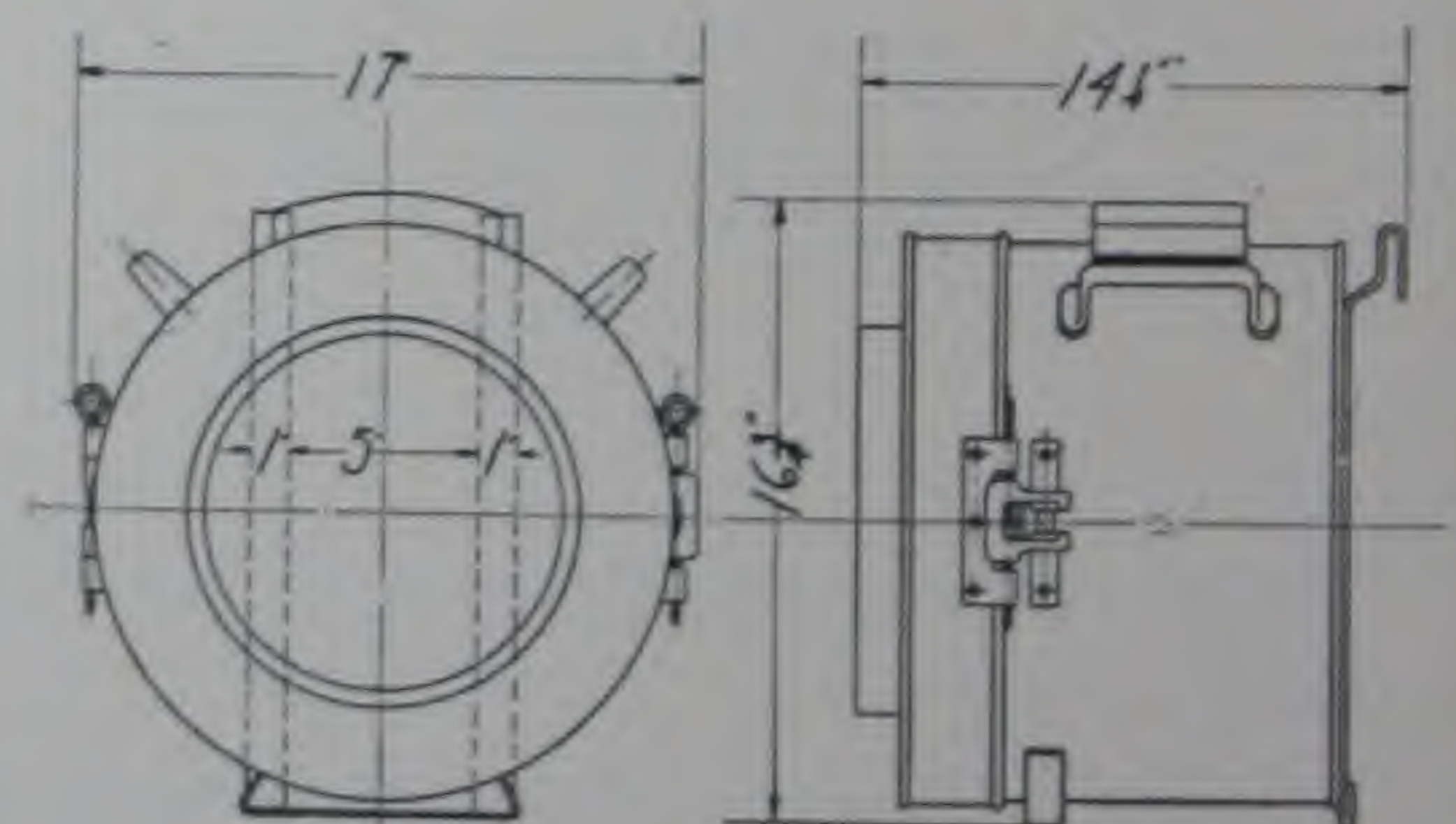


Diagram No. 6
Types C, D, K and L

Dimensional Diagrams

For Types M, ML, MLF, MLD, MLK, V and VR Headlights

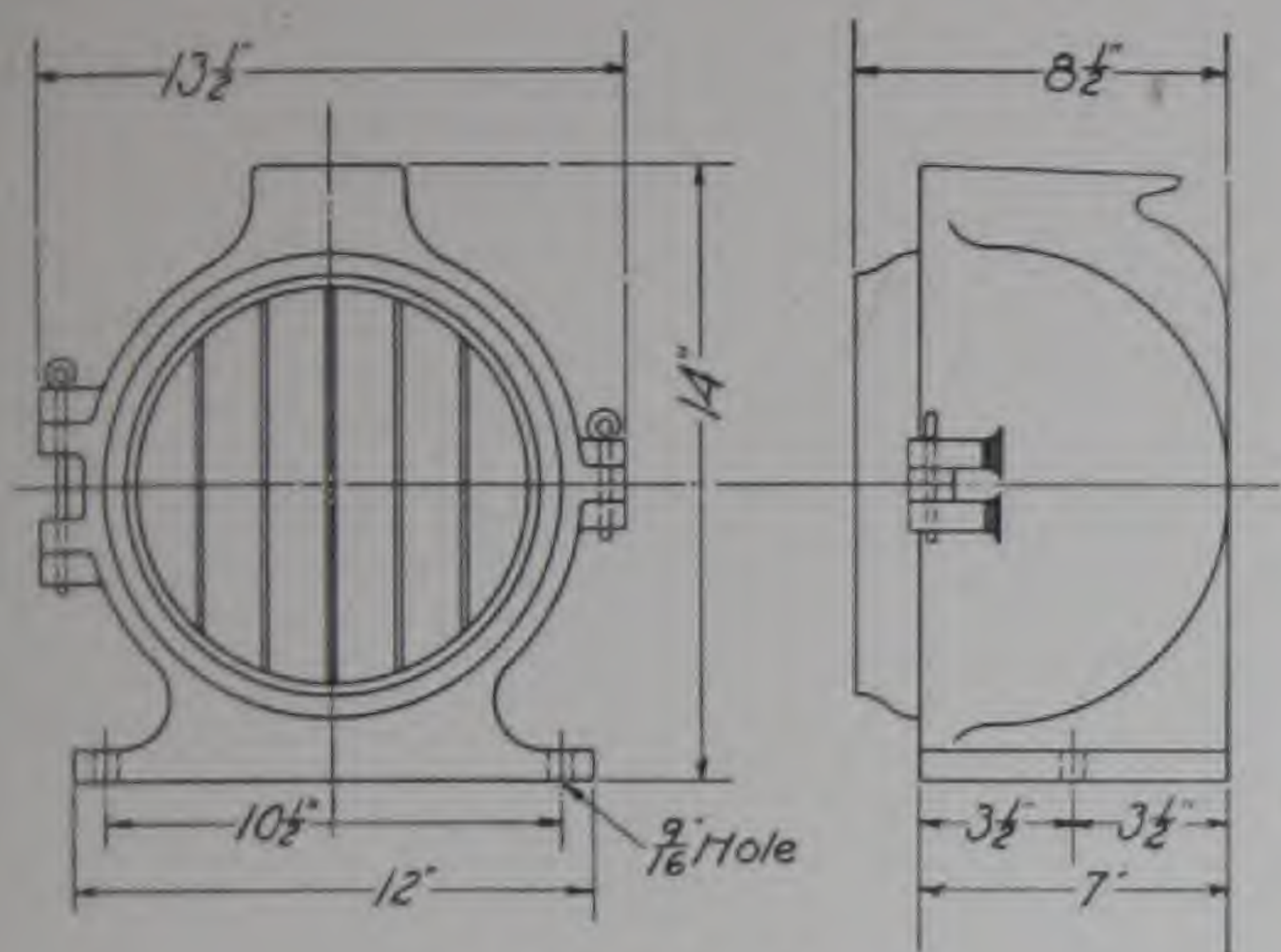


Diagram No. 1
Type M

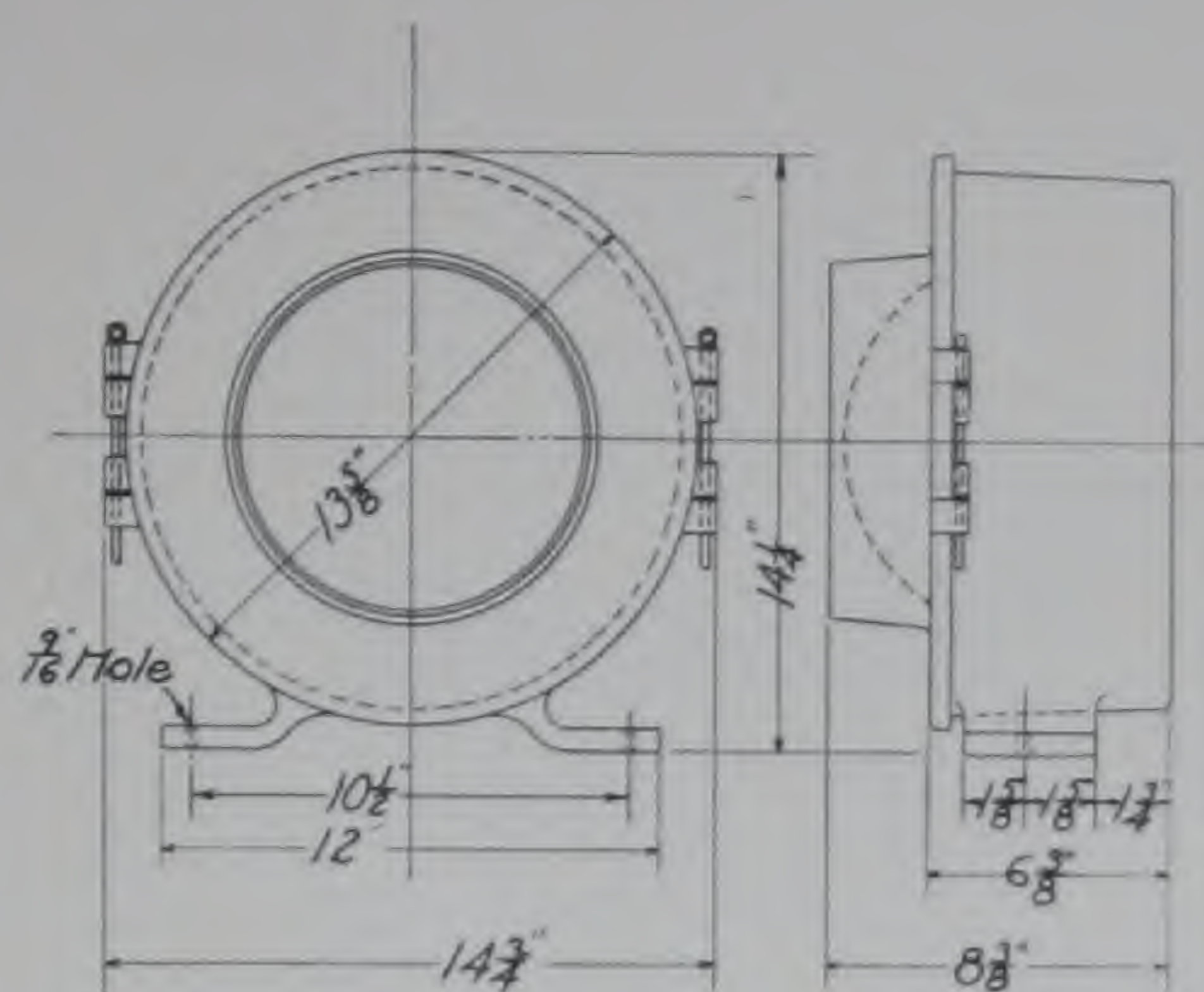


Diagram No. 2
Type ML

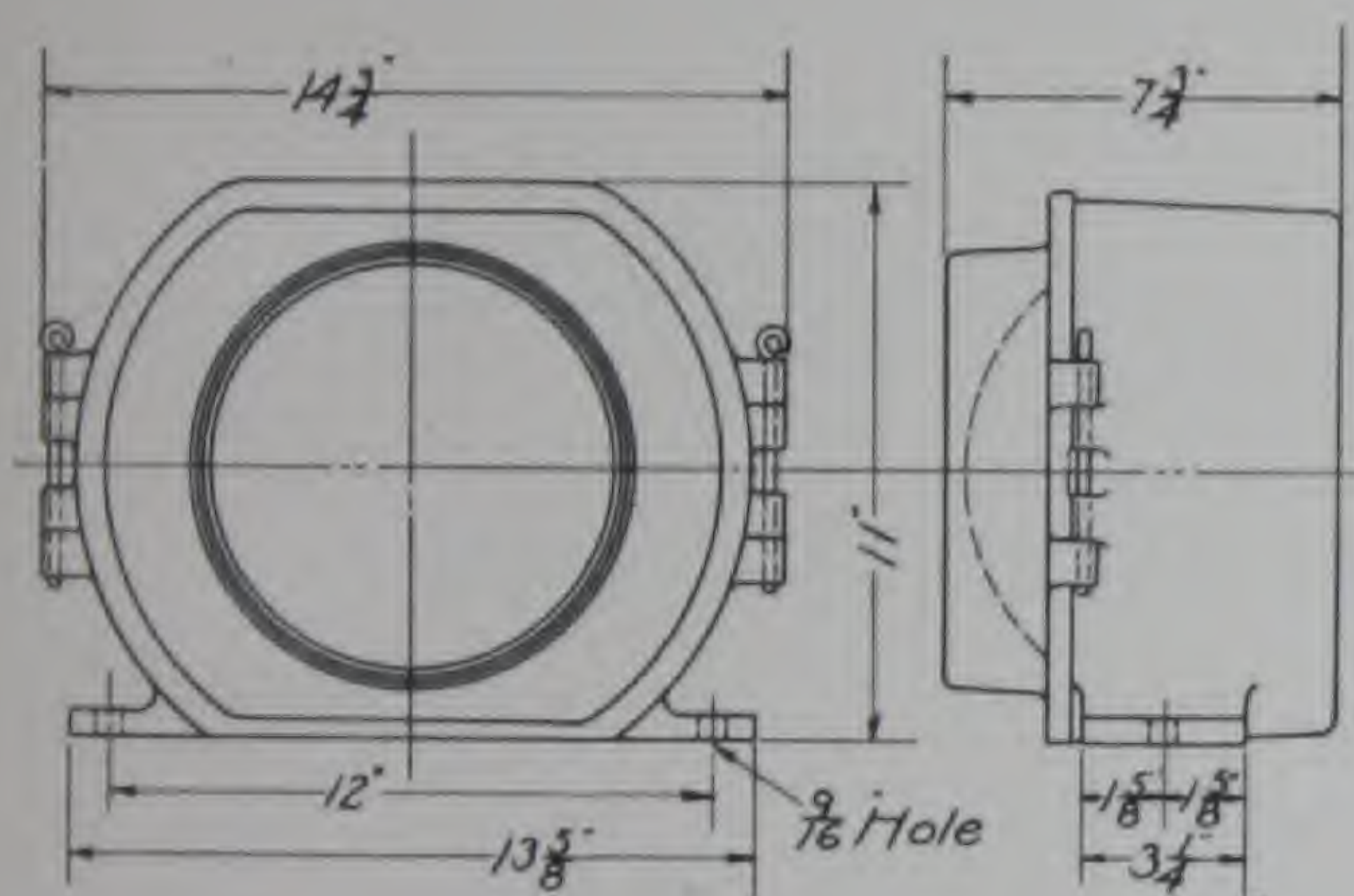


Diagram No. 3
Types MLF and MLD

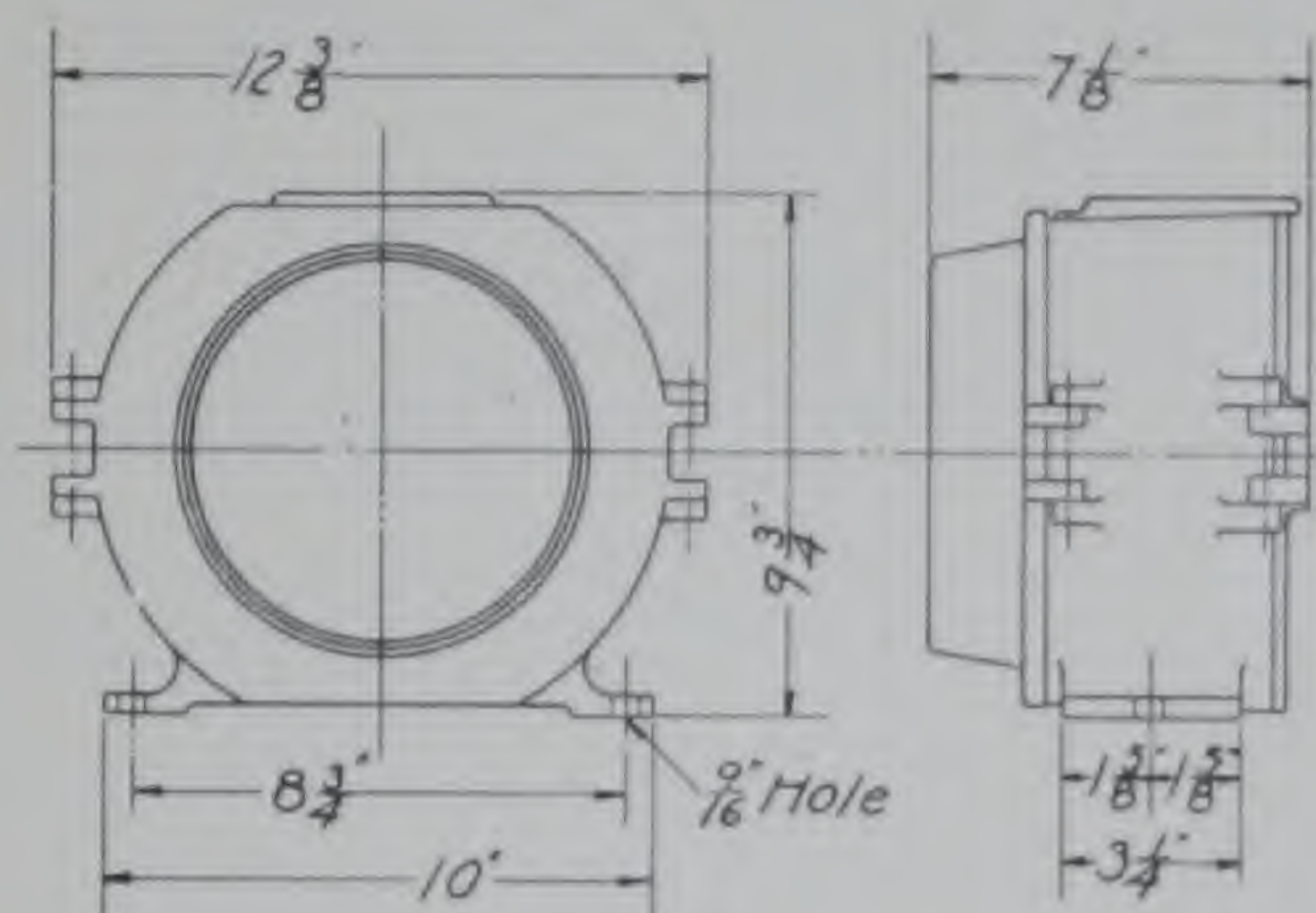


Diagram No. 4
Type MLK

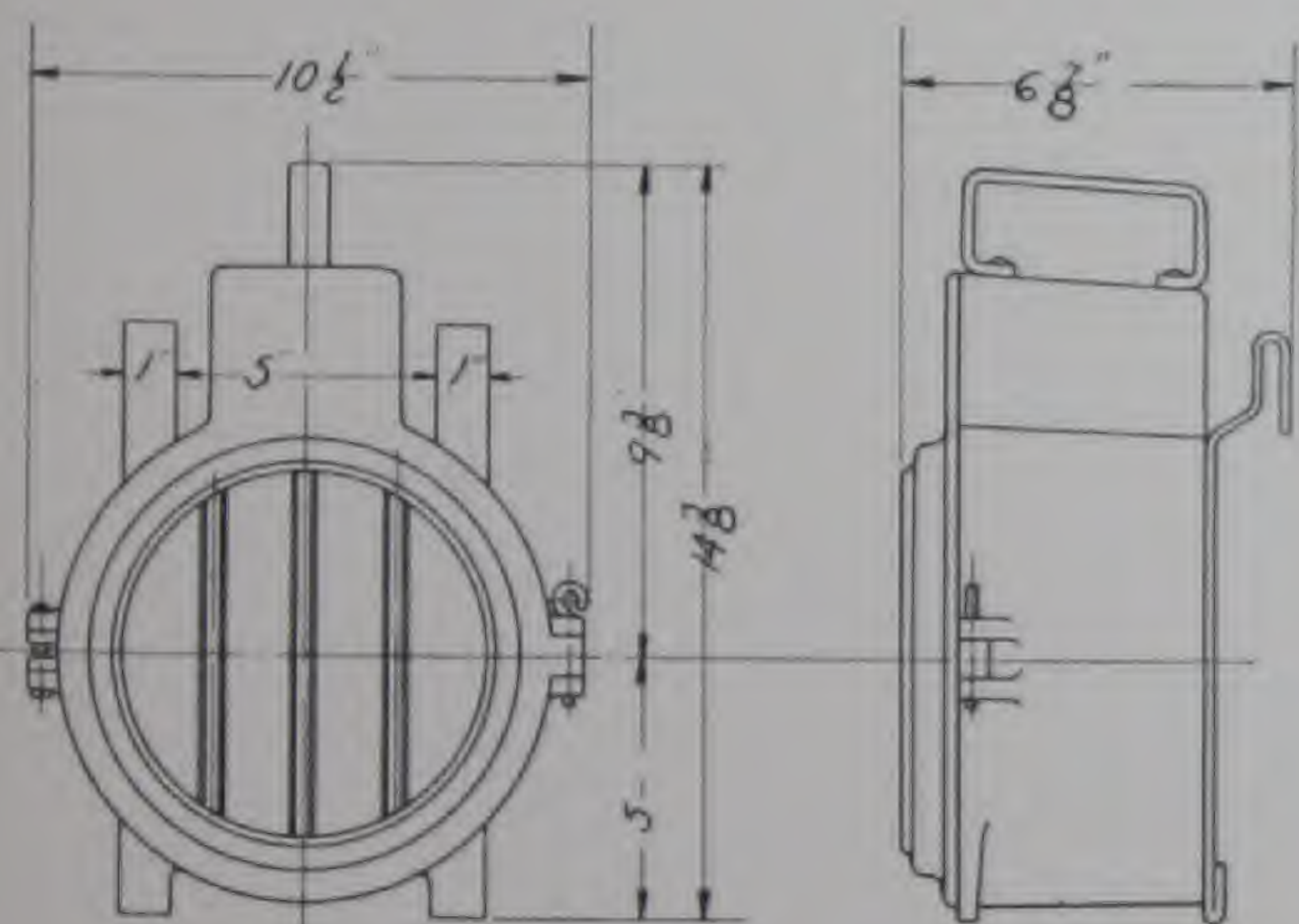


Diagram No. 5
Type V

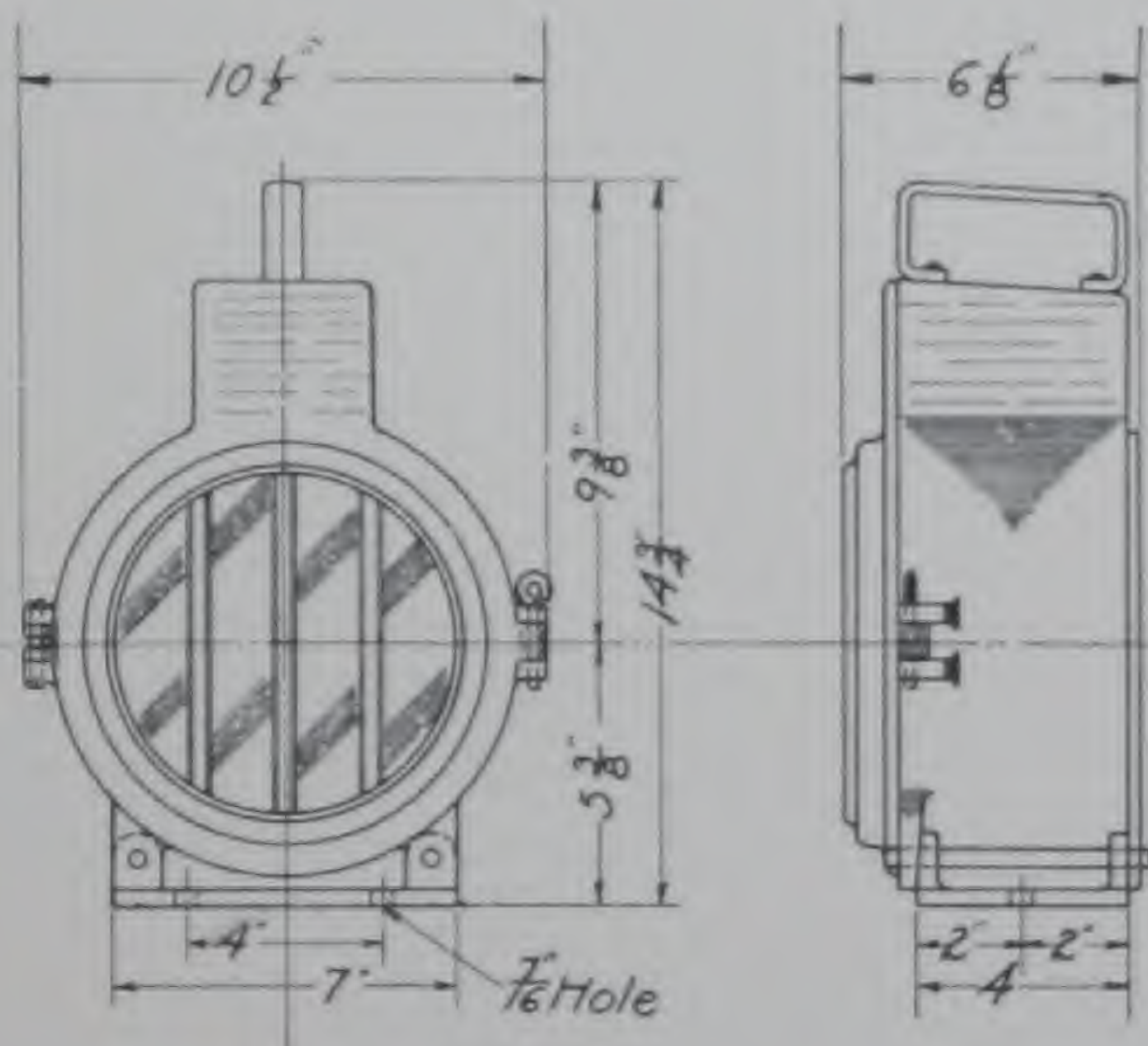


Diagram No. 6
Type VR

Dimensional Diagrams

For Turret Bases for Types M, ML, MLF, MLD, MLK and VR Headlights

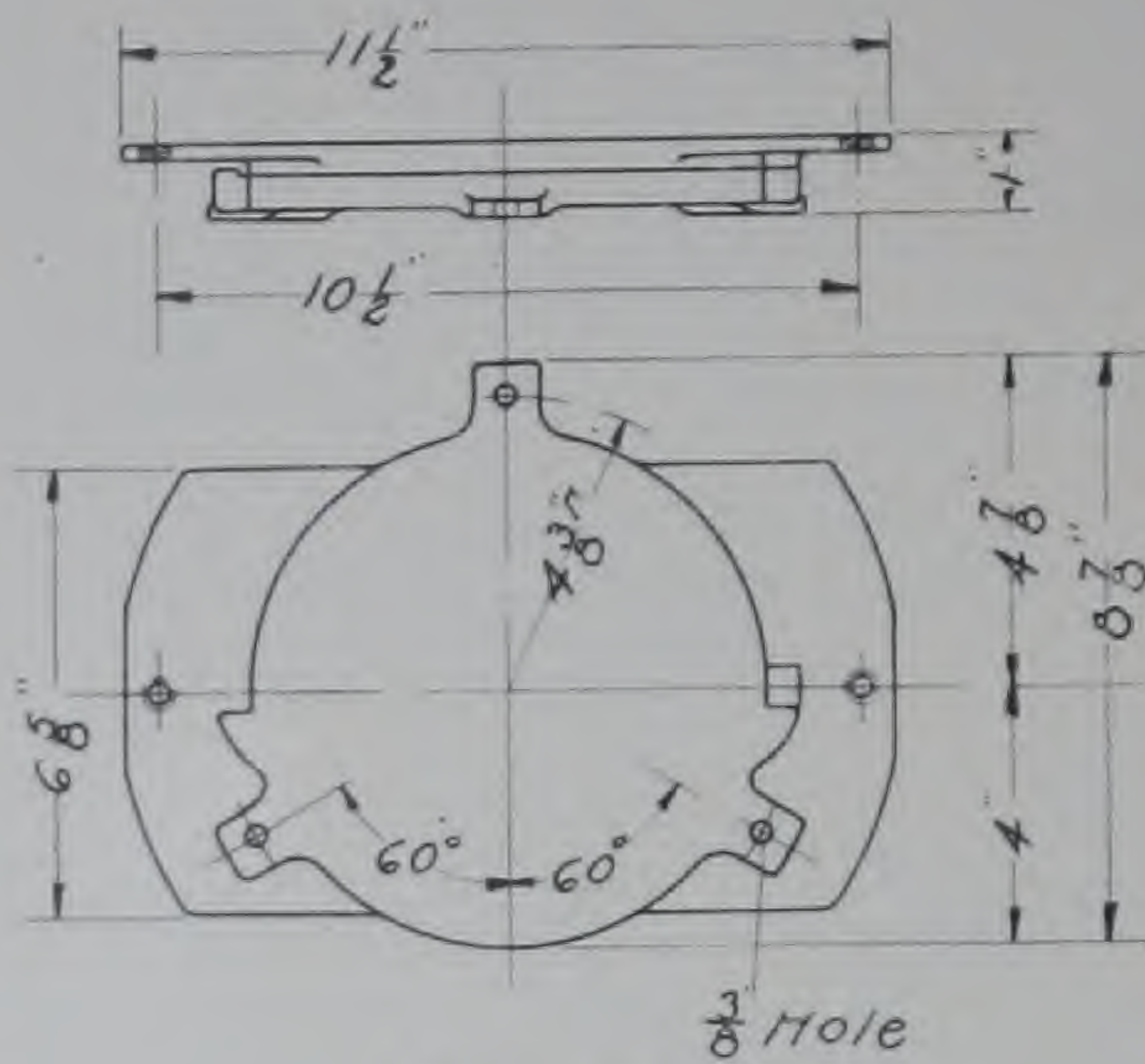


Diagram No. 1
Turret Base for
Types M and ML Headlights

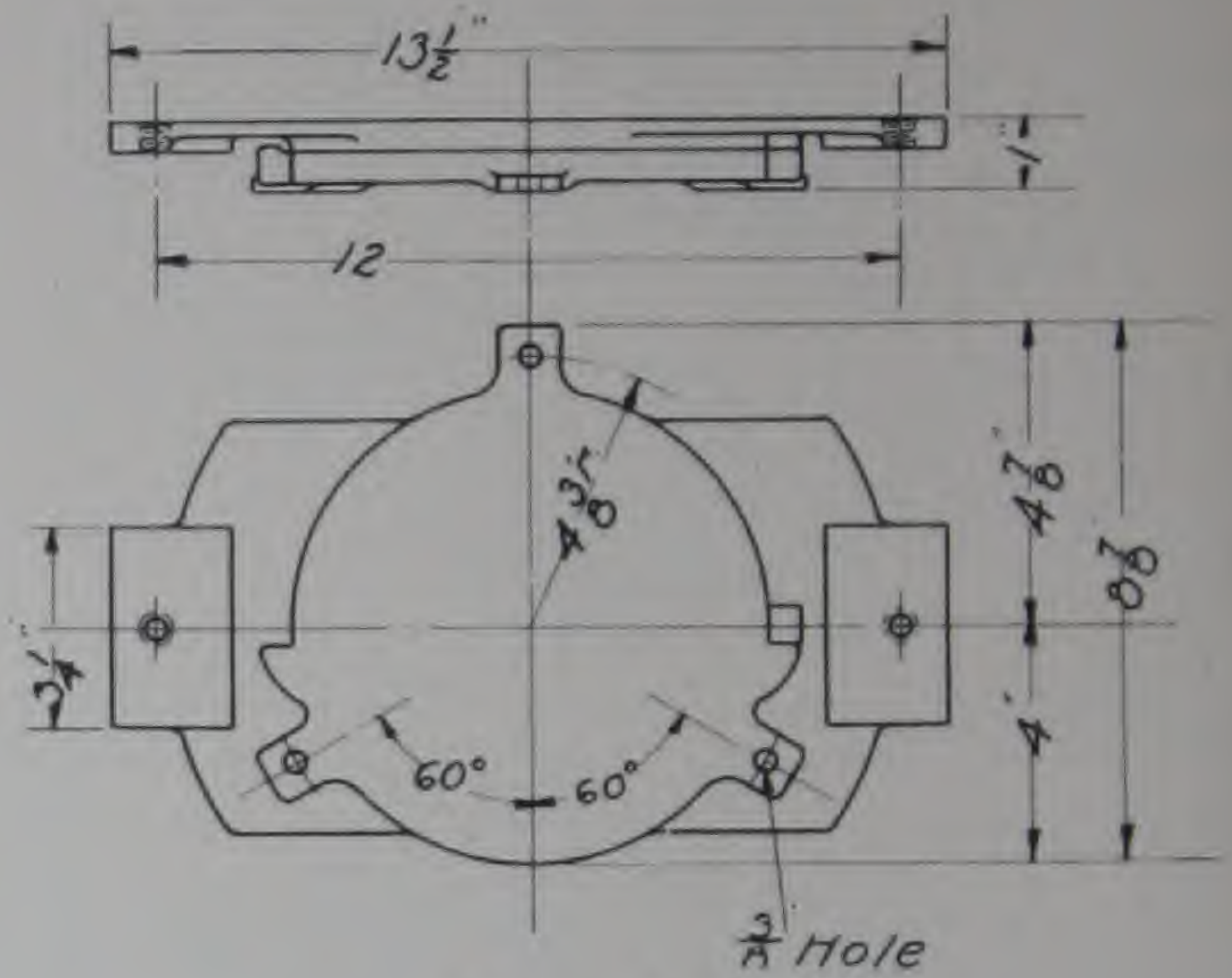


Diagram No. 2
Turret Base for
Types MLF and MLD Headlights

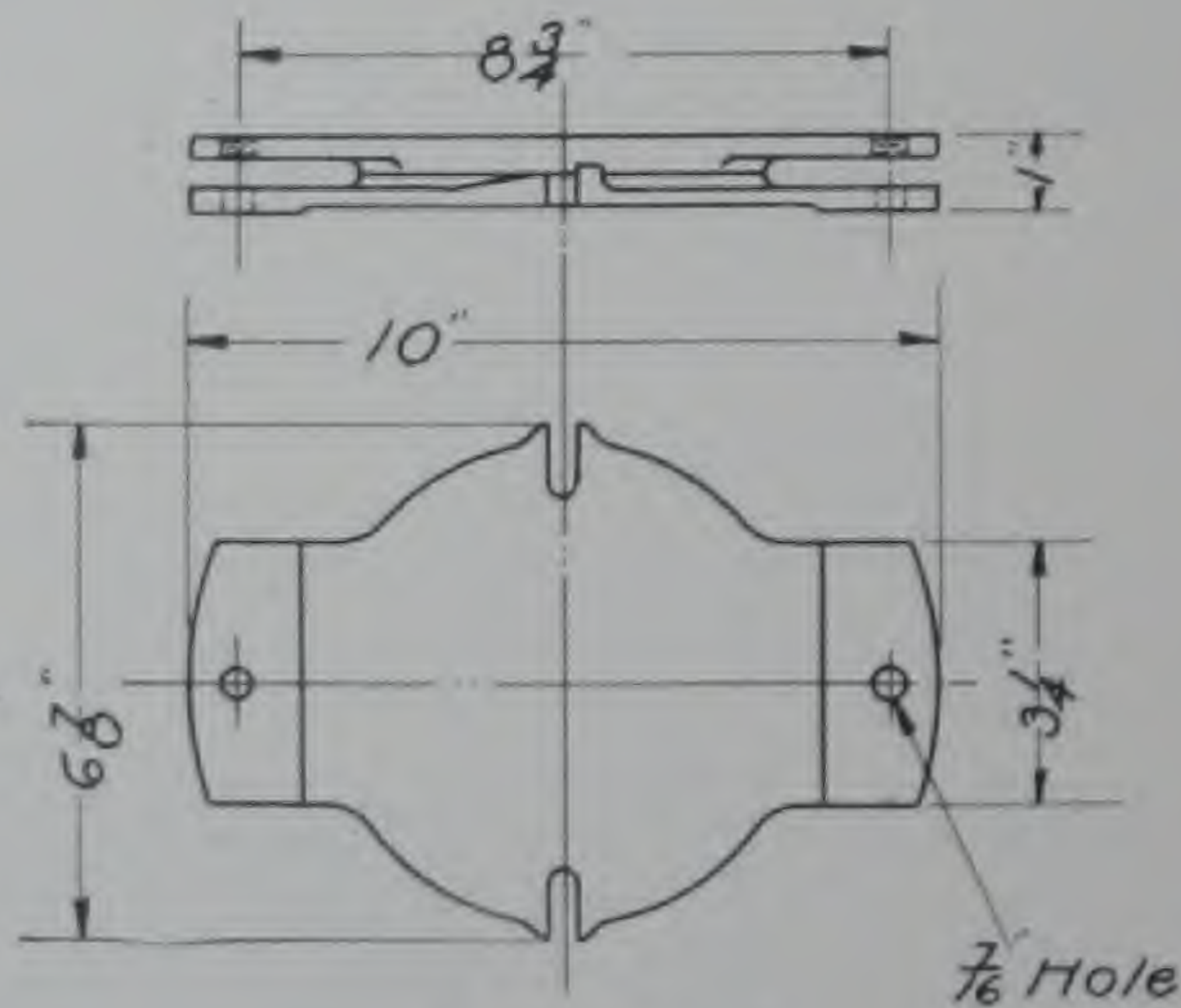
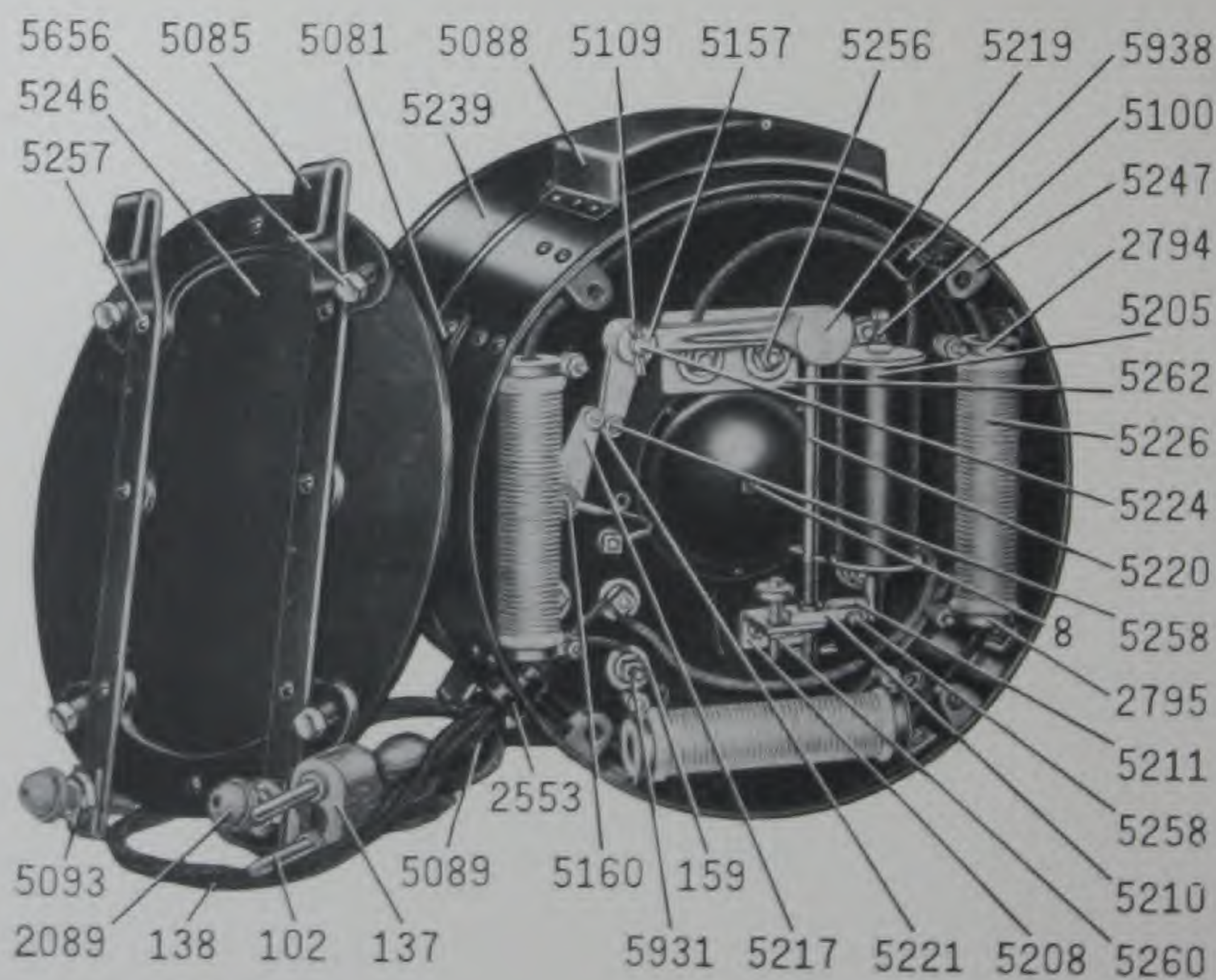
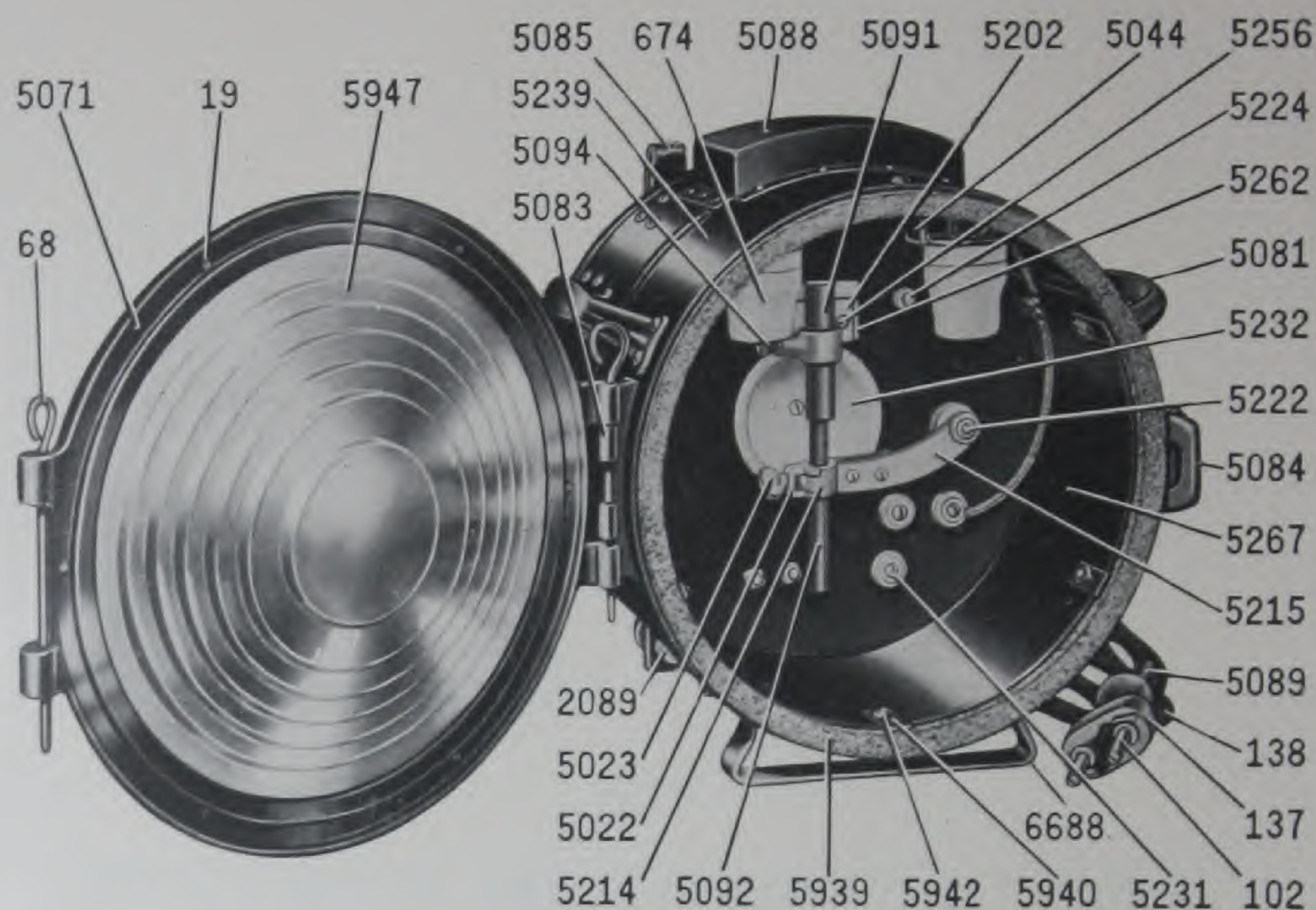


Diagram No. 3
Turret Base for
Types MLK and VR Headlights

SUPPLY PARTS
FOR
IMPERIAL LUMINOUS ARC HEADLIGHTS
FOR TRACTION AND MINING SERVICES

Headlight Parts

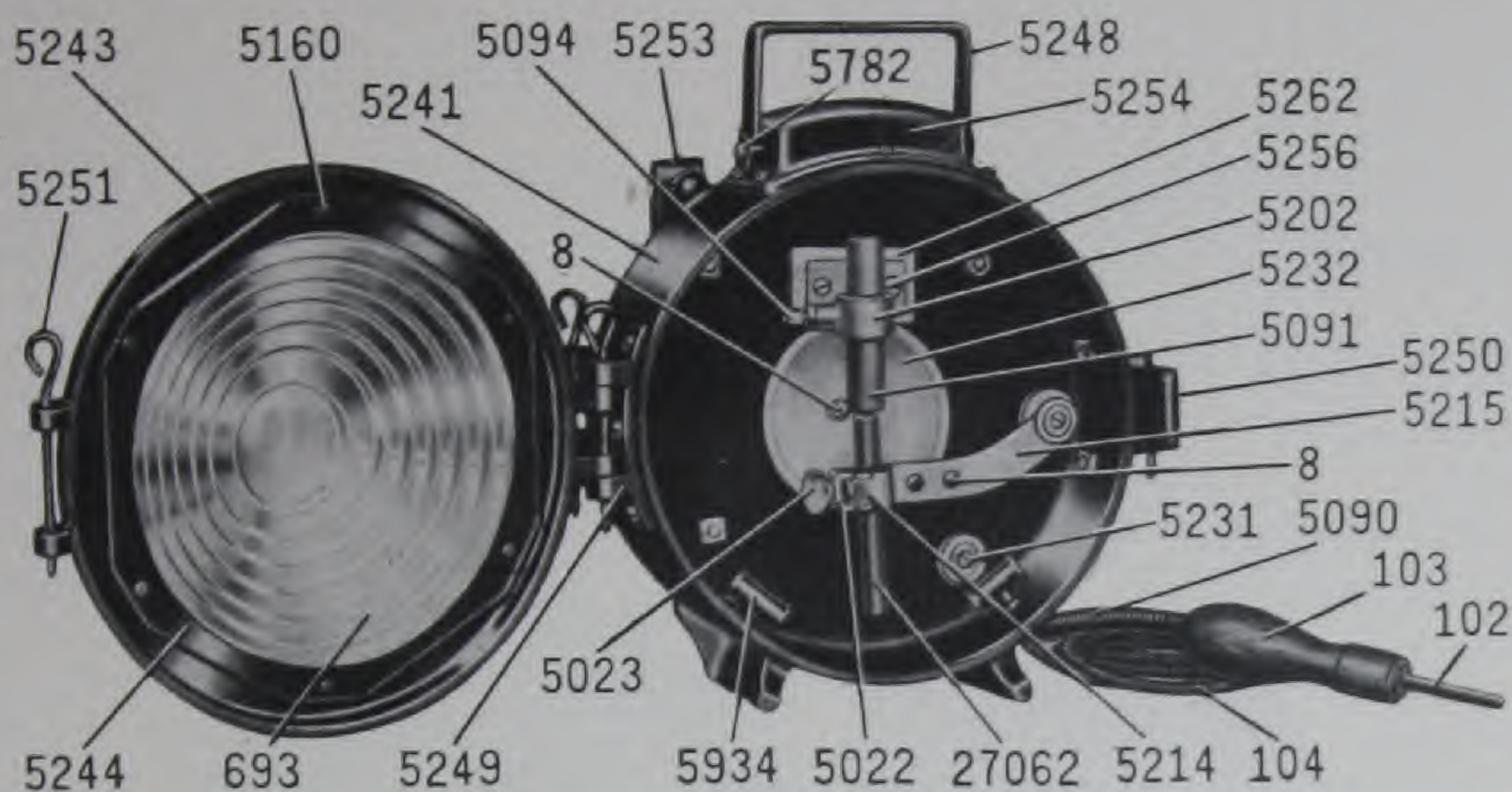
For Types LAA, LBA, LCA, LDA, LGA and LHA Headlights



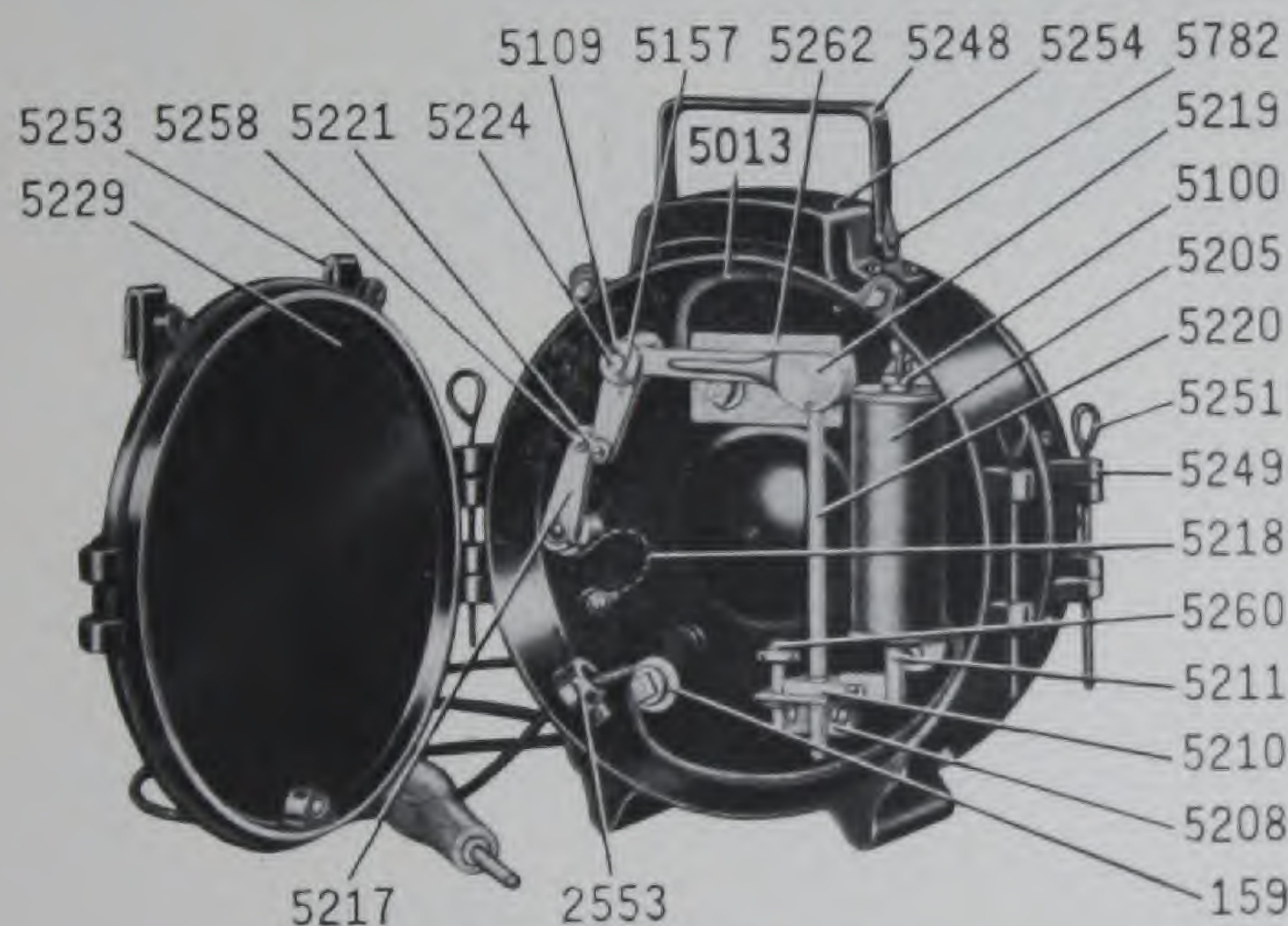
Listings of parts for above headlights, pages 87 to 92, inclusive.

Headlight Parts

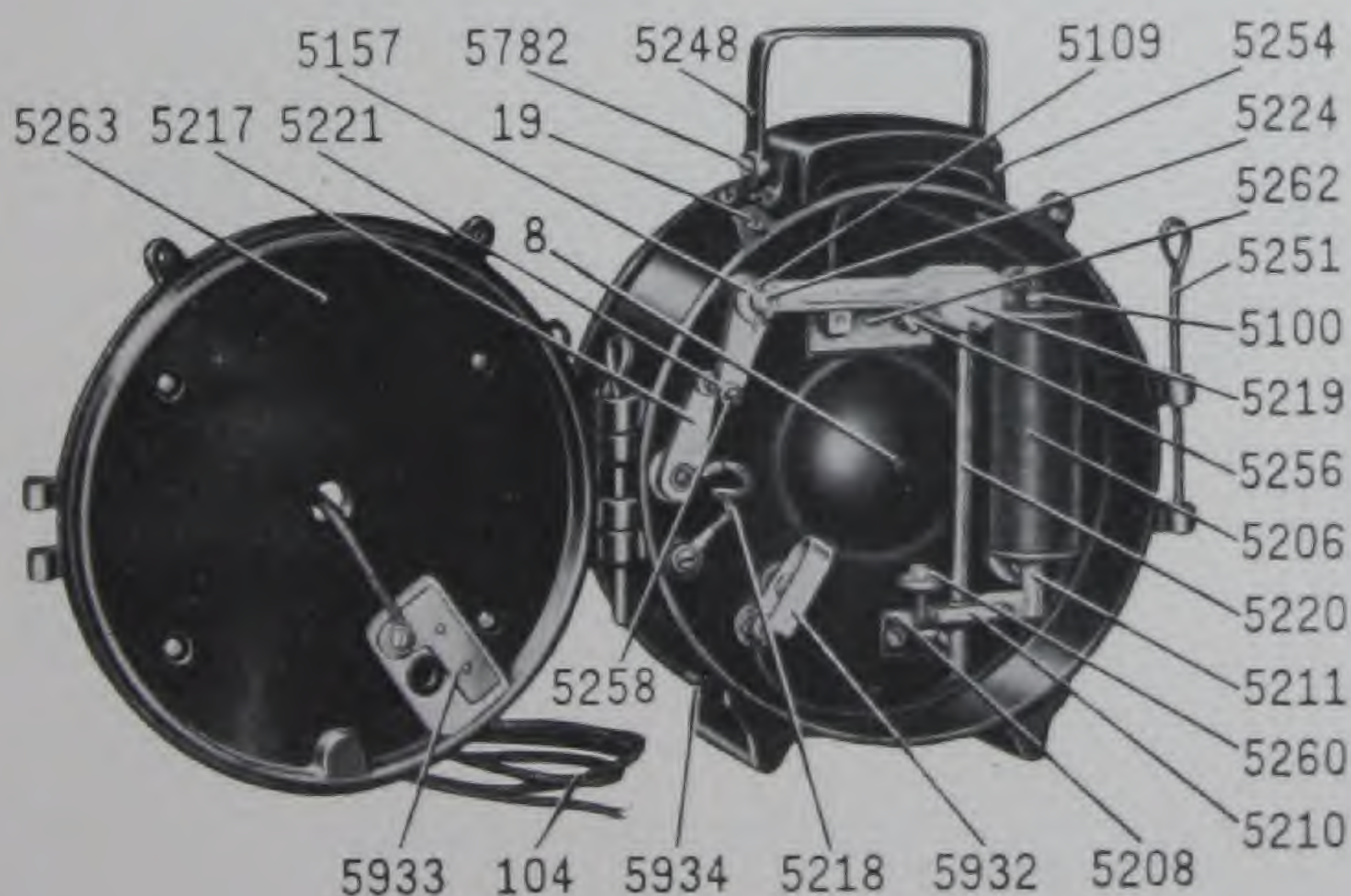
For Types LK and LP Headlights



Front View of Types LK and LP Headlights



Rear View of Type LK Headlight



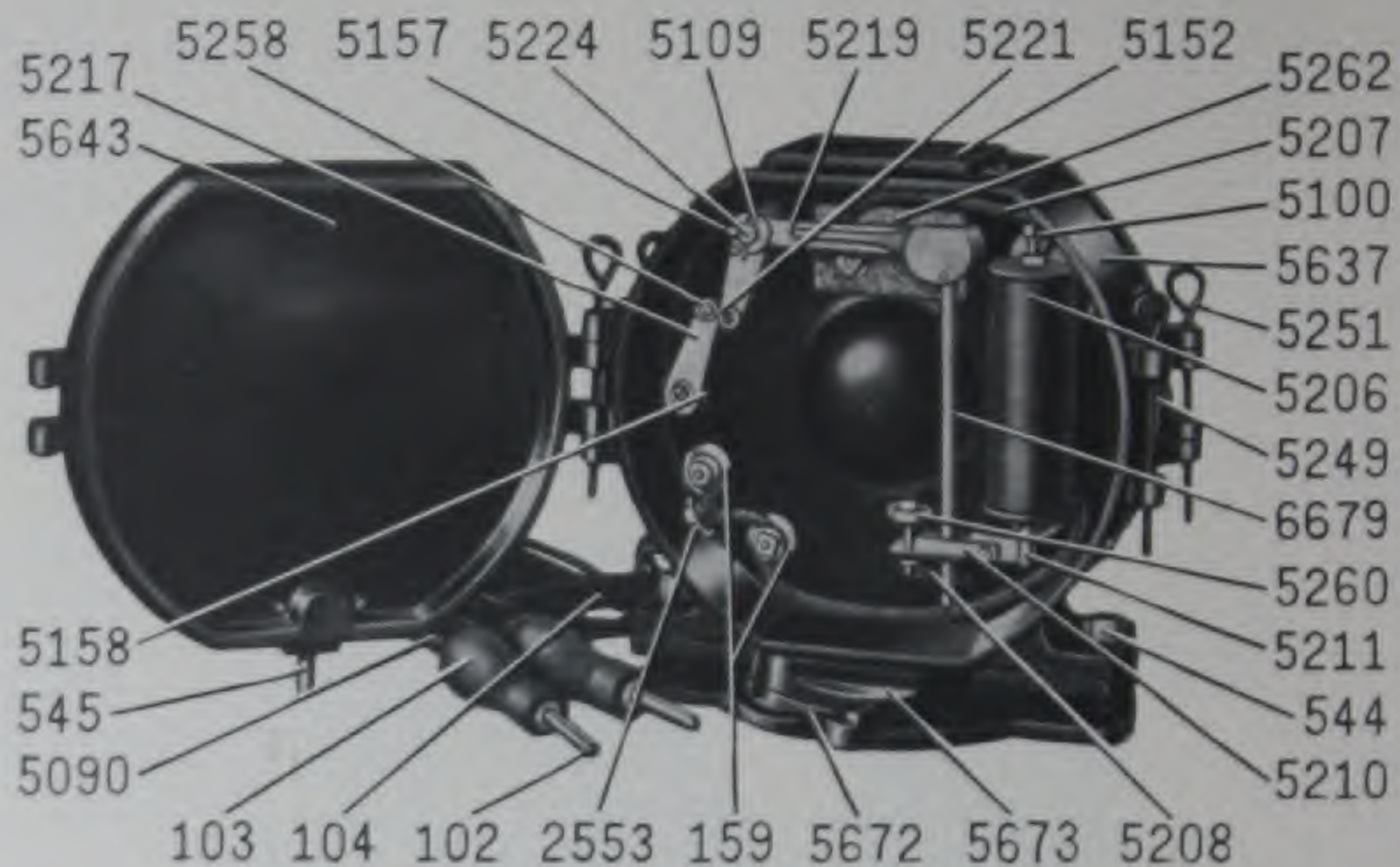
Rear View of Type LP Headlight

Listings of parts for above headlights, pages 87 to 92, inclusive.

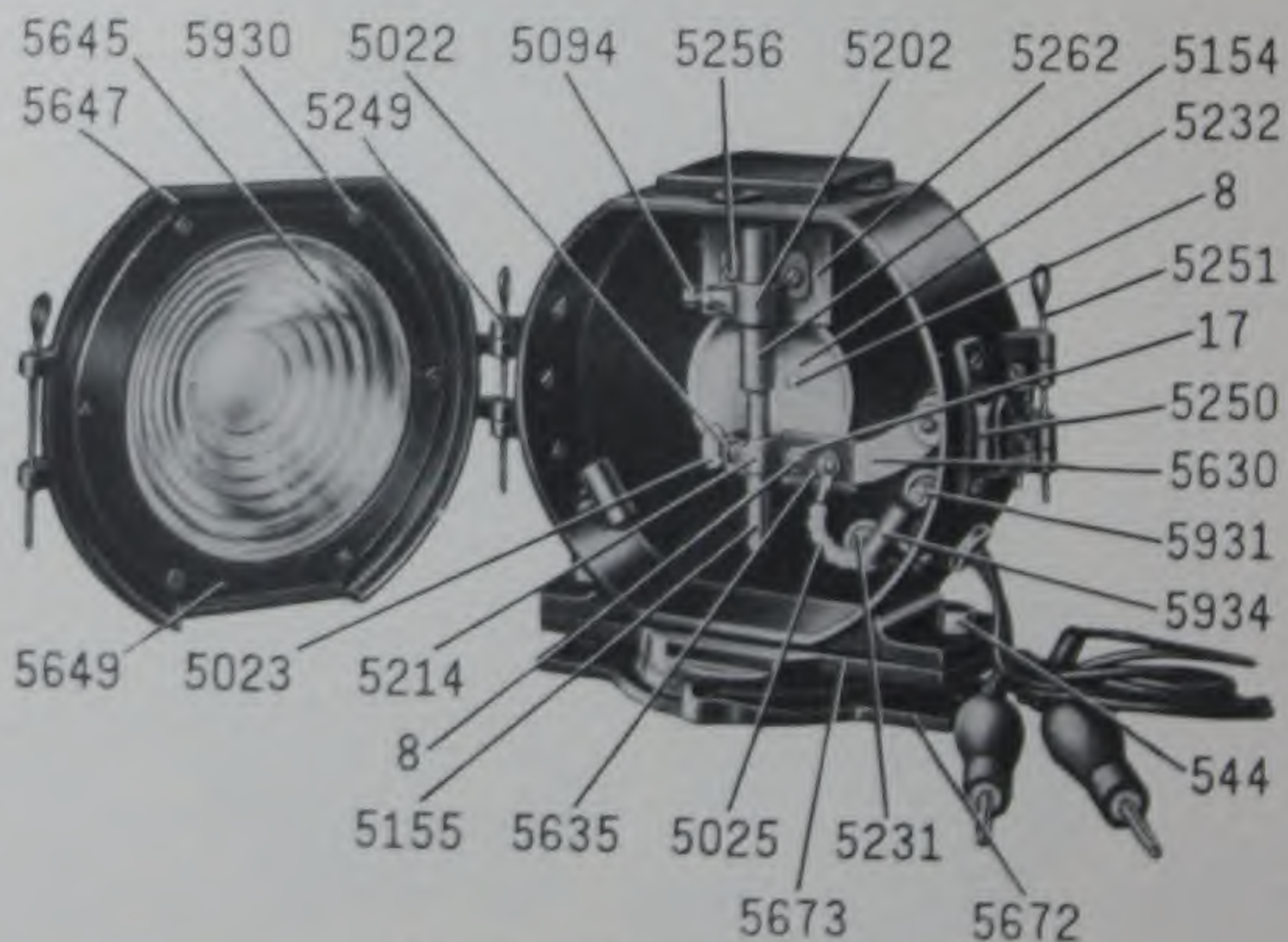
Headlight Parts

For Types MLK and MLD Headlights

NOTE—All of the mechanism parts of type MLD headlight are identical to type MLK, shown below, with the exception of the magnet coil, electrodes and casing. See detailed listings.



Rear View of Type MLK Headlight



Front View of Type MLK Headlight

Listings of parts for above headlights, pages 87 to 92, inclusive.

Listings of Headlight Parts **For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP,** **MLK and MLD Headlights**

Description	Catalog Number	Prices on Application
Upper Electrode Holder complete with Set Screw and Lock Nut, Fastening Screws and Lock Nuts. For Types LAA, LBA, LGA, LHA, LK, LP, MLK and MLD Headlights	HL5200	
Upper Electrode Holder complete with Set Screw and Lock Nut, Fastening Screws and Lock Nuts. For Types LCA and LDA Headlights	HL5201	
Upper Electrode Holder only. For HL5200	HL5202	
Upper Electrode Holder only. For HL5201	HL5203	
Magnet Coil with Adjusting Screws and Nut. For 4-Ampere, 575-Volt, Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP and MLD Headlights	HL5205	
Magnet Coil with Adjusting Screws and Nut. For 2-Ampere, 575-Volt, Types LK and LP Headlights, and for 2-Ampere, 550 or 250-Volt, Type MLK Headlight	HL5206	
Magnet Wire. For Magnet Coil (HL5205) (per pound)	HL5013	
Magnet Wire. For Magnet Coil (HL5206) (per pound)	HL5207	
Magnet Spool complete, less Wire. For Magnets (HL5205, 5206)	HL6680	
Clutch Supporting Bracket with Adjusting Screw, Stop Washer and Lock Nut and Fastening Screws and Nuts. For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP, MLK and MLD Headlights	HL5208	
Clutch Supporting Bracket only. For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP, MLK and MLD Headlights	HL5960	
Magnet Core, Foot Piece, Clutch and Pivot Screw. For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP, MLK and MLD Headlights	HL5209	
Magnet Clutch. For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP, MLK and MLD Headlights	HL5210	
Magnet Core and Foot Piece. For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP, MLK and MLD Headlights	HL5211	
Lower Electrode Holder, including Frame, Clamp, Wing Screw, Supporting Arm, Fastening Screws and Shaft. For Types LAA, LBA, LGA, LHA, LK and LP Headlights, Grounded Circuit	HL5624	
Lower Electrode Holder, including Frame, Clamp, Wing Screw, Supporting Arm, Fastening Screws and Shaft. For Types LCA and LDA Headlights, Grounded Circuit	HL5625	
Lower Electrode Holder, including Frame, Clamp, Wing Screw, Supporting Arm, Mica Insulation, Mica Bushings, Fastening Screws, Beaded Flexible Conductor and Shaft. For Types LAA, LBA, LGA, LHA, LK, MLK and MLD Headlights, Metallic Circuit	HL5626	
Lower Electrode Holder, including Frame, Clamp, Wing Screw, Supporting Arm, Mica Insulation, Mica Bushings, Fastening Screws, Beaded Flexible Conductor and Shaft. For Types LCA and LDA Headlights, Metallic Circuit	HL5627	
Lower Electrode Holder, including Frame, Clamp and Wing Screw. For Types LAA, LBA, LGA, LHA, LK, LP, MLK and MLD Headlights, Grounded or Metallic Circuit	HL5212	
Lower Electrode Holder, including Frame, Clamp and Wing Screw. For Types LCA and LDA Headlights, Grounded or Metallic Circuit	HL5141	
Frame. For Lower Electrode Holder (HL5212)	HL5214	
Frame. For Lower Electrode Holder (HL5141)	HL5021	
Clamp. For Lower Electrode Holders (HL5212, 5141)	HL5022	
Supporting Arm. For Lower Electrode Holder (HL5624)	HL5215	
Supporting Arm. For Lower Electrode Holder (HL5625)	HL5216	
Supporting Arm. For Lower Electrode Holder (HL5626)	HL5630	
Supporting Arm. For Lower Electrode Holder (HL5627)	HL5631	
Beaded Flexible Conductor. For Lower Electrode Holders (HL5626, 5627)	HL5025	
Beads. For Flexible Conductor (HL5025) (per hundred)	HL530	
Contact Tip. For Flexible Conductors (HL5025, 5218)	HL6678	
Wire. For Flexible Conductors (HL5025, 5218) (per foot)	HL529	
Crank Arm. For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP, MLK and MLD Headlights	HL5217	
Flexible Conductor from Crank Arm to the Terminal Screw. For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP, MLK and MLD Headlights, Grounded Circuit	HL5218	

Parts of above headlights, pages 84 to 92, inclusive.

Listings of Headlight Parts **For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP,** **MLK and MLD Headlights—Continued**

Description	Catalog Number	Prices on Application
Balance Arm only. For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP, MLK and MLD Headlights	HL5219	
Clutch Rod only. For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP, MLK and MLD Headlights	HL5220	
Clutch Rod only. For Type MLK (Stationary) Headlight	HL6679	
Connecting Link for Crank Arm (HL5217) and Balance Arm (HL5219). For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP, MLK and MLD Headlights	HL5221	
Shaft and Fastening Screws, connecting Supporting Arms (HL5215, 5216, 5630, 5631) and Crank Arm (HL5217). For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP, MLK and MLD Headlights	HL5222	
Shaft Support. For HL5222	HL5223	
Pivot Stud and Nut, for Balance Arm (HL5219). For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP, MLK and MLD Headlights	HL5224	
Incandescent Resistance Coil complete with Clamp Supports. For Types LAA, LCA and LGA Headlights	HL5225	
Incandescent Lamp Bracket and Socket, wired complete. For Types LAA, LCA and LGA Headlights	HL5151	
Incandescent Resistance Coil only. For Types LAA, LCA and LGA Headlights	HL5226	
Incandescent Resistance Tube without Wire. For Coil (HL5226)	HL5227	
Wire. For Coil (HL5226) (per pound, in less than pound lots)	HL5228	
Wire. For Coil (HL5226) (per pound, in pound lots and over)	HL5228	
Clamp Support with Side Slot. For Resistance Coil (HL5226)	HL2794	
Clamp Support with End Slot. For Resistance Coil (HL5226)	HL2795	
Incandescent Lamp Bracket. For Types LAA, LCA and LGA Headlights	HL5044	
Incandescent Lamp Receptacle, Edison Base. For Types LAA, LCA and LGA Headlights	HL674	
Copper Wire and Asbestos Tubing. For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP, MLK and MLD Headlights (per foot)	HL5046	
Terminal Screw with Lock Nuts, Metal Washers and Insulation. For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP, MLK and MLD Headlights	HL5231	
Terminal Binding Stud with Lock Nuts, Metal Washers and Insulation. For Types LAA, LCA, LGA, MLK and MLD Headlights	HL5931	
Contact Spring. For Type LP Headlight, Grounded Circuit	HL5932	
Contact Plate and Insulating Base, complete. For Type LP Headlight	HL5933	
Porcelain Bushing with Clamp and Clamping Screw and Nut, for Lead Wires. For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP, MLK and MLD Headlights	HL2553	
Porcelain Bushing. For HL2553	HL553	
Clamp with Clamping Screw and Nut. For HL2553	HL554	
Reflector. For Types LAA, LBA, LGA, LHA, LK, LP, MLK and MLD Headlights	HL5232	
Reflector. For Type LCA Headlight	HL5233	
Reflector. For Type LDA Headlight	HL5234	
Two-Point Plug. For Types LAA, LCA and LGA Headlights	HL2137	
One-Point Plug. For Types LBA, LDA, LHA, LK, MLK and MLD Headlights, 600 Volts	HL2103	
One-Point Plug. For Types LBA and LDA Headlights, 1200 Volts	HL6652	
Plug Point. For Plugs (HL2137, 2103) (each)	HL102	
Plug Point and Nut. For One-Point Plug (HL6652)	HL6653	
Handle. For Two-Point Plug (HL2137)	HL137	
Handle. For One-Point Plug (HL2103)	HL103	
Handle. For One-Point Plug (HL6652)	HL6654	
Guard Spring. For Two-Point Plug (HL2137)	HL5089	
Guard Spring. For One-Point Plug (HL2103)	HL5090	
Guard Spring. For One-Point Plug (HL6652)	HL6655	
Twin Twisted Duplex Wire. For Two-Point Plug (HL2137) (per foot)	HL138	
Wire. For One-Point Plug (HL2103) (per foot)	HL104	

Parts of above headlights, pages 84 to 92, inclusive.

Listings of Headlight Parts **For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP,** **MLK and MLD Headlights—Continued**

Description	Catalog Number	Prices on Application
Wire. For One-Point Plug (HL6652) (per foot)	HL6656	
Case and Door complete with "Spreadlite" Inverted Semaphore Lens. For Types LAA and LBA Headlights	HL5945	
Case and Door complete with Optical Semaphore Lens. For Types LAA and LBA Headlights	HL5235	
Case and Door complete with Inverted Semaphore Lens. For Types LAA and LBA Headlights	HL5236	
Case and Door complete with Plain Glass. For Types LCA and LDA Headlights	HL5237	
Case and Door complete with Inverted Semaphore Lens. For Types LGA and LHA Headlights	HL5632	
Cast Iron Case complete with Doors and Optical Semaphore Lens. For Type LK Headlight	HL5238	
Sheet Steel Case complete with Doors and Optical Semaphore Lens. For Type LK Headlight	HL5633	
Case complete with Doors and Optical Semaphore Lens. For Type LP Headlight	HL5264	
Case Complete with Doors and Optical Semaphore Lens. For Portable Type MLK Headlight	HL5616	
Case complete with Stationary Base, Doors and Optical Semaphore Lens. For Type MLK Headlight	HL5634	
Case complete with Stationary Base, Doors and Optical Semaphore Lens. For Type MLD Headlight	HL6657	
Case complete with Turret Base, Doors and Optical Semaphore Lens. For Type MLK Headlight	HL5619	
Case complete with Turret Base, Doors and Optical Semaphore Lens. For Type MLD Headlight	HL6658	
Case complete, but without Door. For Types LAA, LBA, LGA and LHA Headlights	HL5239	
Case complete, but without Door. For Types LCA and LDA Headlights Cast-Iron Case complete, but without Front Door. For Types LK and Portable MLK Headlights	HL5240	
Sheet Steel Case complete, but without Front Door. For Type LK Headlight	HL5241	
Case complete, but without Front Door. For Type LP Headlight	HL5636	
Case complete with Stationary Base, but without Front Door. For Type MLK Headlight	HL5265	
Case complete with Stationary Base, but without Doors. For Type MLD Headlight	HL5637	
Case complete with Turret Base, but without Front Door. For Type MLK Headlight	HL6659	
Case complete with Turret Base, but without Front Door. For Type MLD Headlight	HL5638	
Cast-Iron Case only. For Types LK and LP Headlights	HL6666	
Door complete with "Spreadlite" Inverted Semaphore Lens. For Types LAA and LBA Headlights	HL5941	
Door complete with Optical Semaphore Lens. For Types LAA and LBA Headlights	HL5946	
Door complete with Inverted Semaphore Lens. For Types LAA and LBA Headlights	HL5063	
Door complete with Plain Glass. For Types LCA and LDA Headlights	HL5064	
Door complete with Inverted Semaphore Lens. For Types LGA and LHA Headlights	HL5067	
Door complete with Optical Semaphore Lens. For Types LK and LP Headlights	HL5639	
Front Door complete with 7 ³ / ₈ -inch Optical Semaphore Lens. For Type MLK Headlight	HL5242	
Front door complete, with 8 ³ / ₈ -inch Optical Semaphore Lens. For Type MLD Headlight	HL5640	
Front Door complete with 8 ³ / ₈ -inch Optical Semaphore Lens. For Portable Type MLK Headlight	HL5133	
	HL5617	

Parts of above headlights, pages 84 to 92, inclusive.

Listings of Headlight Parts **For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP,** **MLK and MLD Headlights—Continued**

Description	Catalog Number	Prices on Application
Back of Case, including Lamp Hanger Supports, Lamp Hangers and Fastening Screws. For Cases (HL5239, 5240) for MLK Headlight	HL5246	
Back of Case for MLD Headlight	HL6660	
Cast-Iron Back Door with Hangers. For Case (HL5241)	HL5229	
Sheet Steel Back Door with Hangers. For Case (HL5636)	HL5641	
Back Door. For Case (HL5265)	HL5263	
Back Door. For Cases (HL5637, 5638)	HL5643	
12-Inch "Spreadlite" Inverted Semaphore Lens. For Door (HL5946)	HL5947	
12-Inch Inverted Semaphore Lens. For Door (HL5064)	HL5069	
12-Inch "Noglare" Inverted Semaphore Lens. For Door (HL5064)	HL5949	
12-Inch Optical Semaphore Lens. For Door (HL5063)	HL5068	
12-Inch "Noglare" Optical Semaphore Lens. For Door (HL5063)	HL5950	
8 $\frac{3}{8}$ -Inch Inverted Semaphore Lens. For Door (HL5639)	HL5644	
8 $\frac{3}{8}$ -Inch "Noglare" Inverted Semaphore Lens. For Door (HL5639)	HL5951	
8 $\frac{3}{8}$ -Inch Optical Semaphore Lens. For Doors (HL5242, 5133)	HL693	
8 $\frac{3}{8}$ -Inch "Noglare" Optical Semaphore Lens. For Door (HL5242)	HL5952	
Plain Glass. For Door (HL5067)	HL5070	
7 $\frac{3}{8}$ -Inch Optical Semaphore Lens. For Door (HL5640)	HL5645	
7 $\frac{3}{8}$ -Inch "Noglare" Optical Semaphore Lens. For Door (HL5640)	HL5953	
Frame. For Doors (HL5946, 5063, 5064, 5067)	HL5071	
Frame. For Door (HL5639)	HL5646	
Frame. For Door (HL5242)	HL5243	
Frame. For Door (HL5640)	HL5647	
Frame. For Door (HL5617)	HL5618	
Frame. For Door (HL5133)	HL5936	
Glass Holder Ring. For Doors (HL5063, 5064, 5067, 5946)	HL5075	
Glass Holder Ring. For Door (HL5639)	HL5648	
Glass Holder Ring. For Doors (HL5242, 5617)	HL5244	
Glass Holder Ring. For Door (HL5640)	HL5649	
Glass Holder Ring. For Door (HL5133)	HL5119	
Rubber Packing. For Lenses (HL5068, 5069, 5947, 5949, 5950)	HL5650	
Rubber Packing. For Lenses (HL693, 5644, 5951, 5952)	HL5651	
Rubber Packing. For Lenses (HL5645, 5953)	HL5652	
Rubber Packing. For Plain Glass (HL5070)	HL5653	
Rubber Door Gasket. For Types LAA, LBA, LCA, LDA, LGA and LHA Headlights	HL5939	
Clamp. For Wires inside of Cases, and for Door Gasket (HL5939) on Types LAA, LBA, LCA, LDA, LGA and LHA Headlights (each)	HL5938	
Reinforcing Ring. For Case (HL5239)	HL5078	
Reinforcing Ring and Reflector Support. For Case (HL5240)	HL5245	
Reinforcing Ring. For Case (HL5636)	HL6681	
Apron. For Cases (HL5239, 5240)	HL5267	
Apron. For Case (HL5636)	HL5268	
Lug. For Fastening Back to Cases (HL5239, 5240, 5636)	HL5247	
Bumper Screw complete, including Screw, Lock Nut, Thumb Ring, Stud and Rubber Tip. For all Types of Headlights	HL2089	
Thumb Ring. For Bumper Screw (HL2089)	HL88	
Stud. For Bumper Screw (HL2089)	HL89	
Rubber Tip with Screw (HL86). For Bumper Screw (HL2089)	HL90	
Handle. For Cases (HL5239, 5240)	HL5081	
Handle. For Cases (HL5241, 5636, 5265)	HL5248	
Hinge. For Cases (HL5239, 5240)	HL5083	
Front Door Hinge. For Cases (HL5241, 5265, 5636)	HL5249	
Door Catch. For Cases (HL5239, 5240)	HL5084	
Door Catch. For Cases (HL5241, 5265, 5636)	HL5250	
Pin. For Hinge (HL5083), Door Catch (HL5084) for Type MLD Headlight	HL68	
Pin with Chain. For Type MLD Headlight	HL69	
Pin. For Hinge (HL5249), Door Catch (HL5250) and Back Doors (HL5229, 5263, 5643)	HL5251	
Front Leg. For Cases (HL5239, 5240)	HL6688	

Parts of above headlights, pages 84 to 92, inclusive.

Listings of Headlight Parts **For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP,** **MLK and MLD Headlights—Continued**

Description	Catalog Number	Prices on Application
Front Leg. For Case (HL5636)	HL6682	
Lamp Hanger. For Cases (HL5239, 5240)	HL5085	
Lamp Hanger. For Case (HL5241)	HL5253	
Lamp Hanger. For Case (HL5636)	HL5654	
Cast-Iron Lamp Hanger Support. For Types LAA, LBA, LCA, LDA, LGA and LHA Headlights	HL5961	
Cast-Iron Lamp Hanger Support. For 10-inch Type LK Headlight (sheet steel) Case	HL6683	
Ventilator (sheet metal). For Cases (HL5239, 5240)	HL5088	
Ventilator (cast iron). For Cases (HL5241, 5265, 5636)	HL5254	
Ventilator (cast iron). For Cases (HL5637, 5638)	HL5152	
Lower Ventilator and Nut complete. For Types LK, LP and MLK Headlights	HL5934	
Turret Base complete. For Type MLK Headlight	HL5671	
Base Plate. For Turret Base (HL5671)	HL5672	
Top Plate. For Turret Base (HL5671)	HL5673	
Turret Base Complete for MLD Headlight	HL5134	
Base Plate. For Turret Base (HL5134)	HL540	
Top Plate. For Turret Base (HL5134)	HL5135	
Retaining Plate. For Top Plates (HL5673, 5135)	HL543	
Plunger complete, including Plunger (HL545), Plunger Collar (HL5674) Plunger Spring (HL5675) and Plunger Bracket (HL5677). For Turret Bases (HL5671, 5134)	HL5153	
Plunger. For Plunger complete (HL5153)	HL545	
Plunger Collar. For Plunger complete (HL5153)	HL5674	
Plunger Spring. For Plunger complete (HL5153)	HL5675	
Plunger Bracket, screws to back of Case (HL5638). For Plunger complete (HL5153)	HL5677	
Upper Electrode (3½ x ¾ inches). For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP, MLD and Portable MLK Headlights. (each)	HL5091	
Upper Electrode (3 x ¾ inches). For Type MLK Headlight with Stationary or Turret Base (each)	HL5154	
Lower Electrode (5 x ½ inches). For Types LAA, LBA, LCA, LDA, LGA and LHA Headlights (each)	HL5092	
Lower Electrode (4 x ½ inches). For Types LK, LP, MLD and Portable MLK Headlights (each)	HL27062	
Lower Electrode (3½ x ½ inches). For Type MLK Headlight with Stationary or Turret Base (each)	HL5155	

Screws, Bolts, Nuts, Metal Washers and Cotter Pins

Set Screw with Lock Nut. For all Upper Electrode Holders (per dozen)	HL5094	
Fastening and Terminal Screw with Nut and Lock Nut. For Upper Electrode Holders (HL5200, 5201) (per dozen)	HL5256	
Fastening Screw with Nut. For fastening Lamp Bracket (HL5044), Reflector (HL5232), Reinforcing Rings (HL5078, 5245), Door Catches (HL5084, 5250), Front Leg (HL62), Resistance Supports (HL2794, 2795) and Fastening Lug (HL5247) to Case; for fastening Supporting Arms (HL5630, 5631) to Frames (HL5214, 5021); for fastening Reflectors (HL5233, 5234) to Reflector Support (HL5245). Is also Lower Screw with Nut, for fastening Handle (HL5081) to Case, and for fastening Felt Washer Clamp (HL5940) to Case (per dozen)	HL8	
Fastening Screw with Nut. For fastening Supporting Arms (HL5215, 5216) to Frame (HL5021) (per dozen)	HL7	
Fastening Screw with Nut (Upper Fastening Screw for Handle). For fastening Handle (HL5081) and Apron (HL5267) to Case; for fastening Apron (HL5268) to Case, and for fastening Wire Clamp and Felt Washer Clamp (HL5938) to Case. (per dozen)	HL5096	
Wing Screw. For Lower Electrode Holders (HL5212, 5141) (each)	HL5023	
Screw with Nut. For fastening Lamp Hanger to Cases (HL5239, 5240, 5241, 5636) (per dozen)	HL5257	

Parts of above headlights, pages 84 to 92, inclusive.

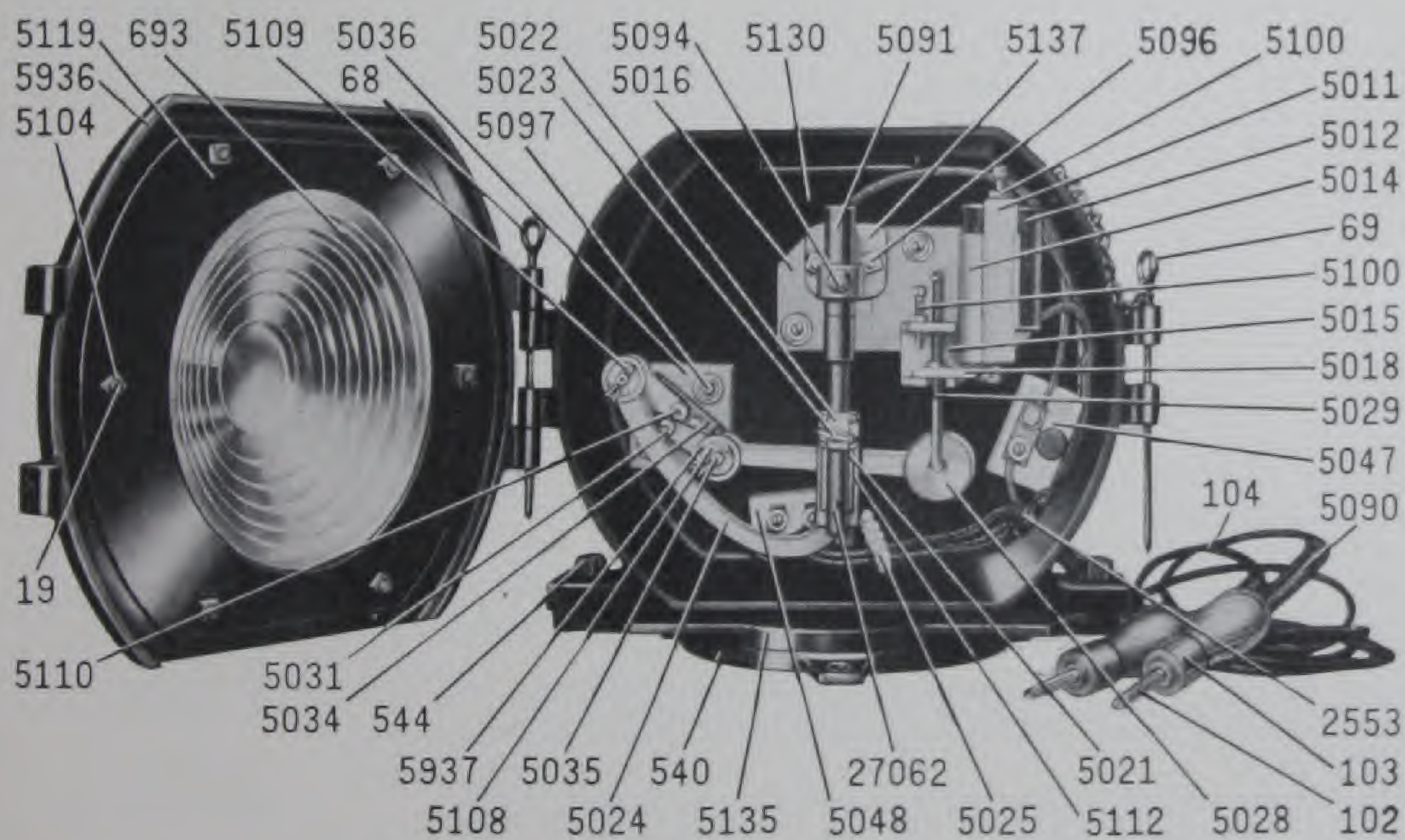
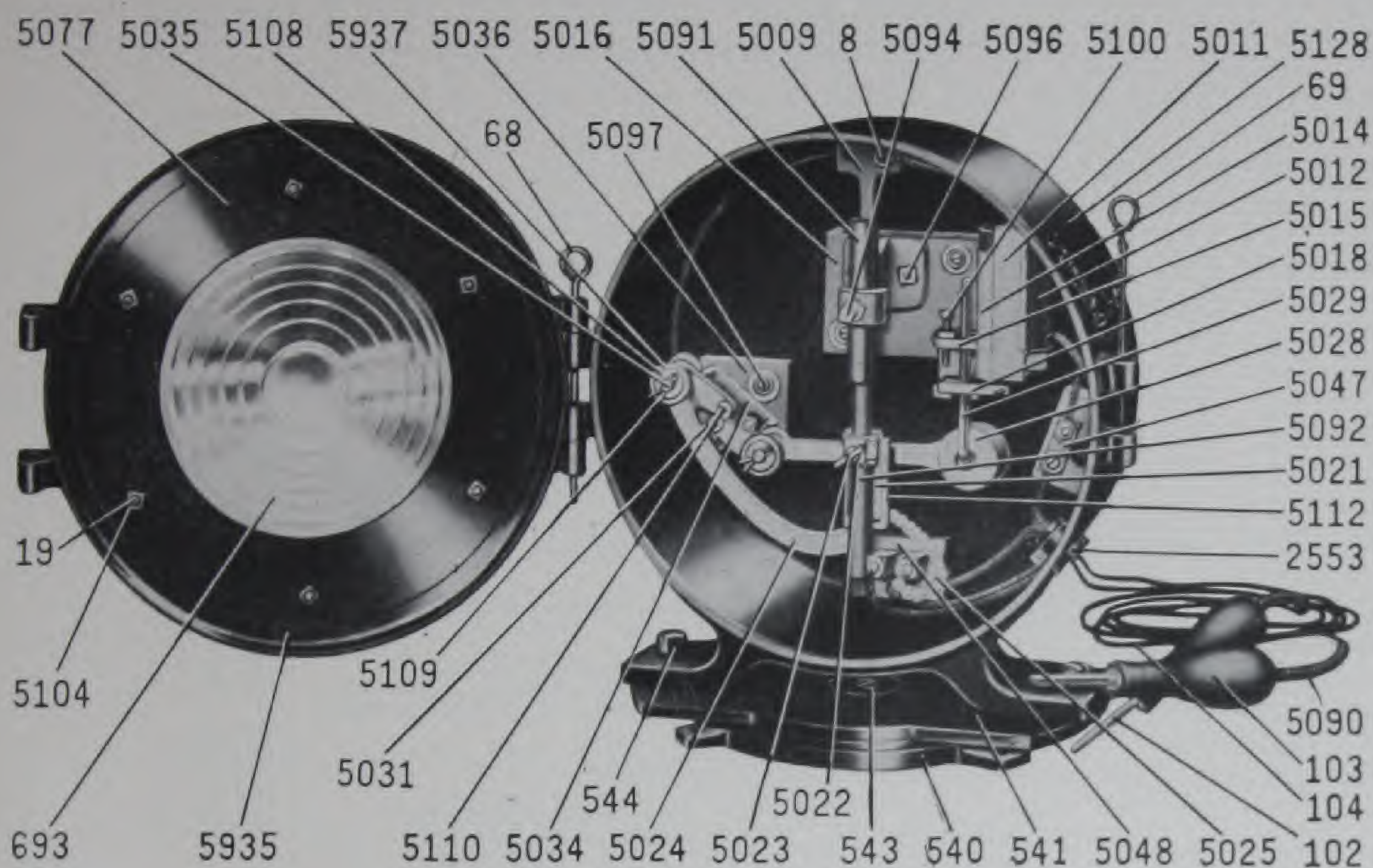
Listings of Headlight Parts **For Types LAA, LBA, LCA, LDA, LGA, LHA, LK, LP,** **MLK and MLD Headlights—Continued**

Description	Catalog Number	Prices on Application
Pivot Screw. For Connecting Link (HL5221) and Clutch (HL5210) . . . (per dozen)	HL5258	
Fastening Screw. For Glass Holder Rings (HL5074, 5075) . . . (per dozen)	HL19	
Fastening Screw. For Glass Holder Ring (HL5244) and Shaft Support (HL5223) . . . (per dozen)	HL5160	
Fastening Screw and Nut. For Glass Holder Ring (HL5649) . . . (per dozen)	HL5930	
Fastening Screw with Nut. For Receptacle (HL674) . . . (per dozen)	HL5098	
Cap Screw. For fastening Back Doors (HL5263, 5641) to Cases (HL5265, 5636) . . . (each)	HL5656	
Cap Screw for fastening back to case of Type MLD Headlight . . .	HL6661	
Adjusting Screw with Lock Nut. For Magnet Coils (HL5205, 5206) . . . (per dozen)	HL5100	
Adjusting Screw and Stop Washer with Lock Nut. For Magnet Clutch (HL5210) . . . (each)	HL5260	
Screw. For fastening Headlight to Plate (HL5673) . . . (each)	HL544	
Screw. For Retaining Plate (HL543) . . . (per dozen)	HL542	
Bolt with Nut. For fastening Handle (HL5248) to Cases (HL5241, 5636, 5265) . . . (each)	HL5782	
Lock Nut. For Bumper Screw (HL2089) . . . (each)	HL5093	
Metal Washer. For Screws (HL8, 19, 5096) . . . (per dozen)	HL17	
Metal Washer. For Plug Point (HL102) . . . (per dozen)	HL107	
Metal Washer. For Pivot Stud (HL5224) . . . (per dozen)	HL5157	
Iron Spacing Washer. For use with Lamp Hanger (HL5085) on Cases (HL5239, 5240) . . . (per dozen)	HL5962	
Felt Washer. For Shaft (HL5222) . . . (per dozen)	HL5158	
Stop Washer. For Adjusting Screw (HL5100) . . . (per dozen)	HL5159	
Cotter Pin. For Clutch Rod (HL5220) and for Pivot Stud (HL5224) . . . (per dozen)	HL5109	
Mica Washers, Insulation and Bushings		
Mica Washer. For Terminal Screw (HL5256) . . . (per dozen)	HL159	
Mica Insulators. For Upper Electrode Holders complete (HL5200, 5201) . . . (per dozen)	HL5262	
Mica Insulation. For Supporting Arms (HL5630, 5631) . . .	HL5635	
Mica Bushing. For Upper Electrode Holders (HL5200, 5201) and Fastening or Terminal Screw (HL5256) . . . (per dozen)	HL5261	
Mica Bushing. For Supporting Arms (HL5630, 5631) . . . (per dozen)	HL276	

Parts of above headlights, pages 84 to 92, inclusive.

Headlight Parts

For Types ML and MLF Headlights



Listings of parts for above headlights, pages 94 to 96, inclusive.

Listings of Headlight Parts **For Types ML and MLF Headlights**

Description	Catalog Number	Prices on Application
Upper Electrode Holder complete, with Set Screw and Lock Nut, Terminal Binding Screw and Metal Washer, and Fastening Screws and Lock Nuts. For Type ML Headlight	HL5008	
Upper Electrode Holder complete, with Set Screw and Lock Nut, Terminal Binding Screw and Metal Washer and Fastening Screws and Lock Nuts. For Type MLF Headlight	HL5136	
Upper Electrode Holder only. For (HL5008)	HL5009	
Upper Electrode Holder only. For (HL5136)	HL5137	
Magnet Coil complete with Yoke, Magnetic Shield and Adjusting Screws and Nuts. For 550-Volt Types ML and MLF Headlights . .	HL5010	
Magnet Coil complete with Yoke, Magnet Shield and Adjusting Screws and Nuts. For 250-Volt Types ML and MLF Headlights	HL5138	
Magnet Yoke. For Types ML and MLF Headlights	HL5011	
Magnet Coil. For 550-Volt Types ML and MLF Headlights	HL5012	
Magnet Coil. For 250-Volt Types ML and MLF Headlights	HL5139	
Magnet Wire. For Magnet Coil (HL5012) (per pound)	HL5013	
Magnet Wire. For Magnet Coil (HL5139) (per pound)	HL5140	
Magnet Spool Complete, less Wire. For Magnet Coils (HL5012, 5139)	HL6684	
Magnetic Shield. For Magnet Coils (HL5010, 5138)	HL5014	
Supporting Bracket. For Magnet Yoke (HL5011) and Magnet Coils (HL5012, 5139)	HL5015	
Insulating Block. For Upper Electrode Holders (HL5008, 5136)	HL5016	
Magnet Core, Foot Piece, Clutch and Cotter Pin. For Types ML and MLF Headlights	HL5017	
Magnet Clutch. For Types ML and MLF Headlights	HL5018	
Magnet Core and Foot Piece. For Types ML and MLF Headlights . .	HL5019	
Lower Electrode Holder complete with Frame, Clamp, Wing Screw, Supporting Arm, Cotter Pin for Link, Mica Insulation, Mica Bushing, Fastening Screws and Beaded Flexible Conductor. For Types ML and MLF Headlights	HL5020	
Lower Electrode Holder, including Frame, Clamp and Wing Screw. For Types ML and MLF Headlights	HL5141	
Frame. For Lower Electrode Holder (HL5020)	HL5021	
Clamp. For Lower Electrode Holder (HL5020)	HL5022	
Supporting Arm. For Lower Electrode Holder (HL5020)	HL5024	
Beaded Flexible Conductor. For Lower Electrode Holder (HL5020) . .	HL5025	
Beads. For Flexible Conductor (HL5025) (per hundred)	HL530	
Contact Tip. For Flexible Conductors (HL5025, 5218)	HL6678	
Wire. For Flexible Conductors (HL5025, 5218) (per foot)	HL529	
Balance Arm complete with Link and Cotter Pin, and Clutch Rod and Cotter Pin. For Types ML and MLF Headlights	HL5026	
Balance Arm only. For Types ML and MLF Headlights	HL5028	
Clutch Rod only. For Types ML and MLF Headlights	HL5029	
Connecting Link for Supporting Arm (HL5024) and Balance Arm (HL5028). For Types ML and MLF Headlights	HL5031	
Insulating Block complete with Supporting Bracket for Lower Electrode Supporting Arm, Balance Arm, Pivot Studs and Nuts, Cotter Pins, Metal Washers and Fastening Screws and Nuts. For Types ML and MLF Headlights	HL5032	
Supporting Bracket complete with Pivot Stud and Stud Nuts, for Lower Electrode Supporting Arm and Balance Arm. For Types ML and MLF Headlights	HL5033	
Supporting Bracket only. For Supporting Bracket complete (HL5033) .	HL5034	
Pivot Stud. For Lower Electrode Supporting Arm (HL5024) and Balance Arm (HL5028)	HL5035	
Insulating Block. For Supporting Bracket complete (HL5033)	HL5036	
Bare Copper Wire and Asbestos Tubing. For Types ML and MLF Headlights (per foot)	HL5046	
Insulating Block complete with Terminal Screws, Nuts and Washers, for Lower Electrode Terminals. For Types ML and MLF Headlights	HL5047	

Parts of above headlights, pages 93 to 96 inclusive.

Listings of Headlight Parts **For Types ML and MLF Headlights—Continued**

Description	Catalog Number	Prices on Application
Main Lead Wire Terminal Block complete with Posts, Screws and Washers. For Types ML and MLF Headlight, Metallic Circuit . . .	HL5048	
Porcelain Bushing with Clamp and Clamping Screw, for Lead Wires. For Types ML and MLF Headlights	HL2553	
Porcelain Bushing. For HL2553	HL553	
Clamp complete with Screw. For HL2553	HL554	
One-Point Plug. For Types ML and MLF Headlights	HL2103	
Plug Point. For One-Point Plug (HL2103)	HL102	
Handle. For One-Point Plug (HL2103)	HL103	
Guard Spring. For One-Point Plug (HL2103)	HL5090	
Wire. For One-Point Plug (HL2103) (per foot)	HL104	
Case complete with Stationary Base, Door and Optical Semaphore Lens. For Type ML Headlight.	HL5124	
Case complete with Turret Base, Door and Optical Semaphore Lens. For Type ML Headlight	HL5125	
Case complete with Stationary Base, Door and Optical Semaphore Lens. For Type MLF Headlight	HL5126	
Case complete with Turret Base, Door and Optical Semaphore Lens. For Type MLF Headlight	HL5127	
Case and Stationary Base complete, but without Door. For Type ML Headlight	HL5128	
Case and Turret Base complete, but without Door. For Type ML Headlight	HL5129	
Case and Stationary Base complete, but without Door. For Type MLF Headlight	HL5130	
Case and Turret Base complete, but without Door. For Type MLF Headlight	HL5131	
Door complete with Optical Semaphore Lens. For Type ML Headlight	HL5132	
Door complete with Optical Semaphore Lens. For Type MLF Headlight	HL5133	
8 $\frac{3}{8}$ -Inch Optical Semaphore Lens. For Doors (HL5132, 5133)	HL693	
8 $\frac{3}{8}$ -Inch "Noglare" Optical Semaphore Lens. For Doors (HL5132, 5133)	HL5952	
Frame. For Door (HL5132)	HL5935	
Frame. For Door (HL5133)	HL5936	
Glass Holder Ring. For Door (HL5132)	HL5077	
Glass Holder Ring. For Door (HL5133)	HL5119	
Rubber Packing. For Lenses (HL693, 5952)	HL5651	
Catch Pin. For Hinge	HL68	
Catch Pin with Chain. For Door Catch	HL69	
Ventilator Base (cast iron). For Old Style Case	HL5086	
Ventilator Cover (cast iron). For Base (HL5086)	HL5087	
Turret Base complete. For Type ML Headlight	HL2540	
Turret Base complete. For Type MLF Headlight	HL5134	
Base Plate. For Turret Bases (HL2540, 5134)	HL540	
Top Plate. For Turret Base (HL2540)	HL541	
Top Plate. For Turret Base (HL5134)	HL5135	
Retaining Plate. For Top Plates (HL541, 5135)	HL543	
Locking Pin. For Top Plates (HL541, 5135)	HL545	
Stop Plate with Screw (HL7), attached to rear of Case. For Locking Pin (HL545)	HL546	
Upper Electrode (3 $\frac{1}{2}$ x $\frac{3}{4}$ inch). For Types ML and MLF Headlights	HL5091	
Lower Electrode (4 x $\frac{1}{2}$ inch). For Type MLF Headlight	HL5092	
Lower Electrode (5 x $\frac{1}{2}$ inch). For Type ML Headlight.	HL27062	

Screws, Nuts, Washers and Cotter Pins

Set Screw and Lock Nut. For all Upper Electrode Holders (per dozen)	HL5094	
Wing Screw. For Lower Electrode Holder Frame (HL5021) . . . (each)	HL5023	
Fastening and Terminal Binding Screw. For Lower Electrode Holder (HL5020). Also Terminal Binding Screw. For Upper Electrode Holders (HL5008, 5136) (per dozen)	HLS	

Parts of above headlights, pages 93 to 96, inclusive.

Listings of Headlight Parts **For Types ML and MLF Headlights—Continued**

Description	Catalog Number	Prices on Application
Screws, Nuts, Washers and Cotter Pins—Continued		
Top Fastening Screw. For Supporting Bracket (HL5015) and Magnet Yoke (HL5011) (per dozen)	HL19	
Fastening Screw with Nut. For Glass Holder Rings (HL5077, 5119) (per dozen)	HL5113	
Bottom Fastening Screw. For Supporting Bracket (HL5015) and Magnet Yoke (HL5011). Also Supporting Screw. For Magnet Coils (HL5012, 5139) (per dozen)	HL5095	
Fastening Screw. For Upper Electrode Holders (HL5008, 5136), and for Supporting Bracket (HL5033) (per dozen)	HL5096	
Fastening Screw. For Insulating Blocks (HL5016, 5036, 5047, 5048) (per dozen)	HL5097	
Adjusting Screw and Lock Nut. For Magnet Coils (HL5010, 5138) and Magnet Clutch (HL5018) (per dozen)	HL5100	
Screw. For Retaining Plate (HL543) (per dozen)	HL542	
Screw. For Fastening Base Plate to Headlight (each)	HL544	
Lock Nut. For Set Screw (HL5094) (per dozen)	HL5102	
Nut and Lock Nut. For Fastening Screw (HL5096). Also Lock Nut. For Adjusting Screw (HL5100). (per dozen)	HL5104	
Nut. For Pivot Stud (HL5035) (per dozen)	HL5106	
Metal Washer. For Screws (HL8, 19, 5095, 5096 and 5097) (per dozen)	HL17	
Metal Washer. For Pivot Stud (HL5035) (per dozen)	HL5108	
Felt Washer. For Pivot Stud (HL5035) (each)	HL5937	
Cotter Pin. For Clutch Rod (HL5029) and for Pivot Stud (HL5035) (per dozen)	HL5109	
Cotter Pin. For Connecting Link (HL5031) and for Clutch (HL5018) (per dozen)	HL5110	

Mica Insulator and Bushing

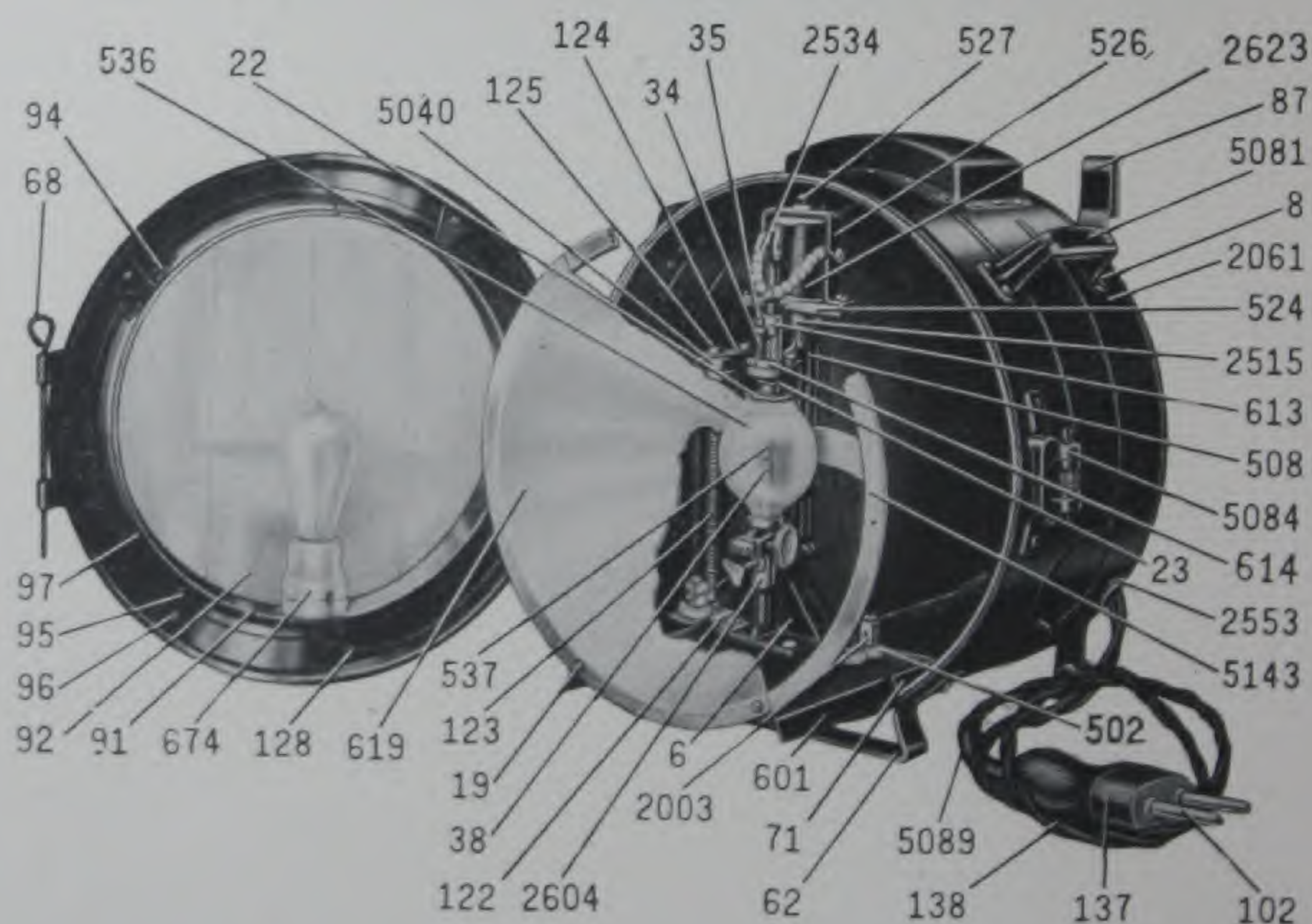
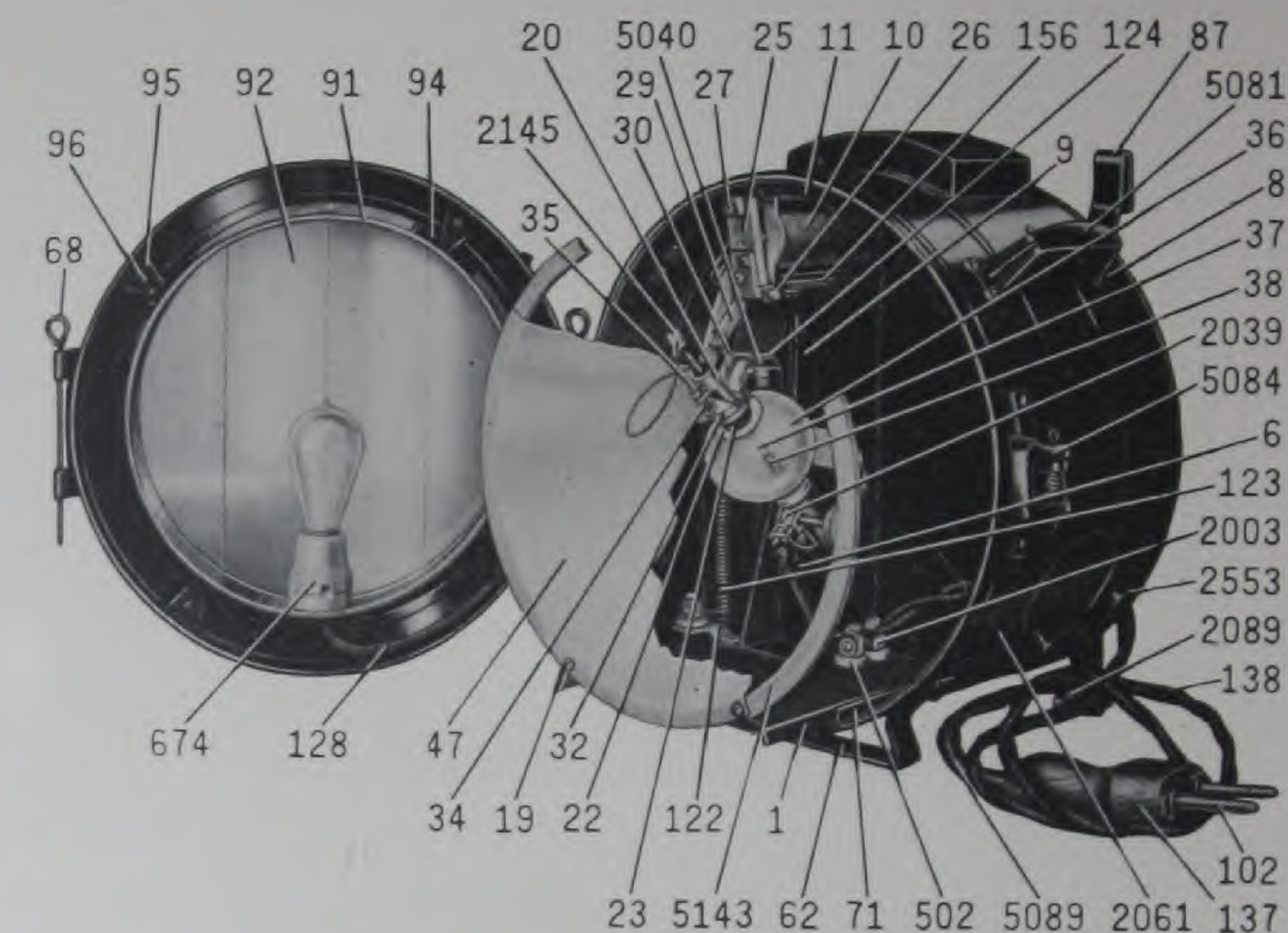
Mica Insulator. For Lower Electrode Holder (HL5020)	HL5112	\$.15
Mica Bushing. For Lower Electrode Holder (HL5020) (per dozen)	HL276	1.00

Parts of above headlights, pages 93 to 96, inclusive.

SUPPLY PARTS
FOR
IMPERIAL CARBON ARC HEADLIGHTS
FOR TRACTION AND MINING SERVICES

Headlight Parts

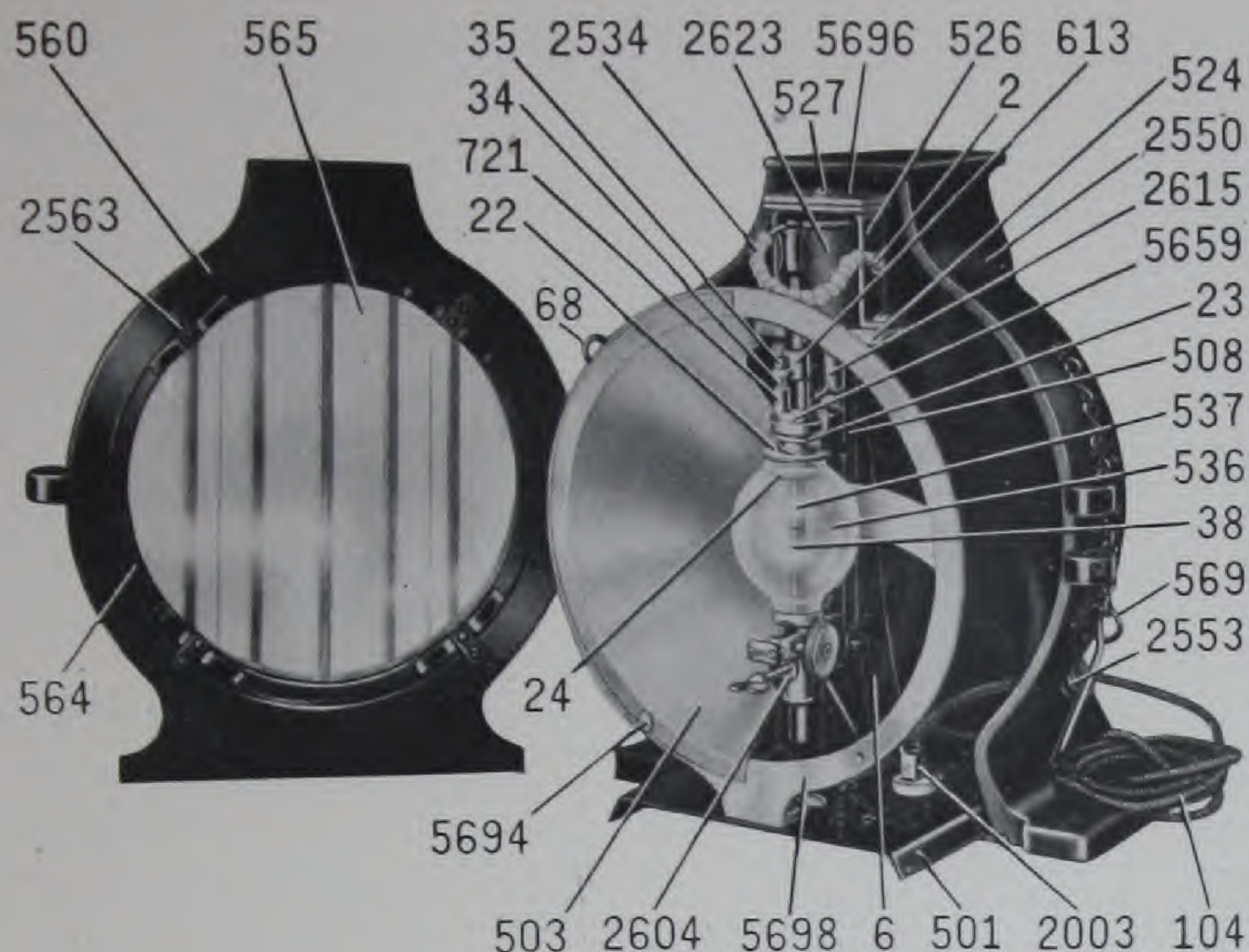
For Types A, B, C, D, H, J, K, L, P and Q Headlights



Listings of parts for above headlights, pages 99 to 105, inclusive.

Headlight Parts

For Type M Headlight



Listings of Headlight Parts

For Types A, B, C, D, H, J, K, L, P, Q and M Headlights

Description		Catalog Number	Prices on Application
Complete Mechanism.	For Type A Headlight	HL2001	
Complete Mechanism.	For Type B Headlight	HL2002	
Complete Mechanism.	For Type C Headlight	HL2188	
Complete Mechanism.	For Type D Headlight	HL2189	
Complete Mechanism.	For Type H Headlight	HL2601	
Complete Mechanism.	For Type J Headlight	HL2602	
Complete Mechanism.	For Type K Headlight	HL2688	
Complete Mechanism.	For Type L Headlight	HL2689	
Complete Mechanism.	For Type P Headlight, (110-volt lamps). (Same as HL2001, except it is fitted with two incandescent lamp fixtures on Base Plate)	HL2007	
Complete Mechanism.	For Type Q Headlight, (110-volt lamps). (Same as HL2601, except it is fitted with two incandescent lamp fixtures on Base Plate)	HL2607	
Complete Mechanism.	For Type M Headlight	HL2500	
Upper Carbon Mechanism complete, including Upper Carbon Holder, Carbon Clutch Equipment, Armature Block complete, Magnet Coil with Yoke and Carbon Clamp with Flexible Conductor. For Types A, B, C, D and P Headlights		HL2029	
Upper Carbon Mechanism complete, including Upper Carbon Holder, Carbon Clutch Equipment, Magnet Coil with Yoke, Support, Brace and Carbon Clamp with Flexible Conductor. For Types H, J, K, L, M and Q Headlights		HL2635	
Upper Carbon Holder complete, including Upper Carbon Holder, Globe Cap, Globe Cap Spring, Split Nut, Guide Stem, Carbon Clutch Equipment and Carbon Clamp with Flexible Conductor. For Types A, B, C, D and P Headlights		HL2020	

Parts of above headlights, pages 98 to 105, inclusive.

Listings of Headlight Parts

For Types A, B, C, D, H, J, K, L, P, Q and M Headlights—Continued

Description	Catalog Number	Prices on Application
Upper Carbon Holder complete, including Upper Carbon Holder, Globe Cap, Globe Cap Spring, Split Nut, Guide Stem and Carbon Clutch Equipment. For Types H, J, K, L, M and Q Headlights	HL2613	
Armature Block complete, including Armature Block, Pivot Screw, Adjusting Screw with Nut and Angle Lever. For Types A, B, C, D and P Headlights	HL2025	
Armature Block. For Armature Block complete (HL2025)	HL25	
Angle Lever. For Armature Block complete (HL2025)	HL29	
Movable Magnet Core with Foot Piece. For Types H, J, K, L, M and Q Headlights	HL2615	
Carbon Clutch Equipment complete, including Washer, Clutch Link, Cotter Pin, Coil Spring and Porcelain Clutch. For Types A, B, C, D and P Headlights	HL2032	
Carbon Clutch Equipment complete, including Washer, Cotter Pin, Coil Spring and Porcelain Clutch. For Types H, J, K, L, M and Q Headlights	HL2614	
Carbon Clutch Equipment complete, including Washer, Cotter Pin, Spring Coil and Metal Clutch. For Type M Headlight	HL5657	
Flexible Conductor complete for Upper Carbon Holder complete (HL2020), including Flexible Cable, Contact Tip, Contact Screw and Carbon Clamp. For Types A, B, C, D and P Headlights	HL2145	
Flexible Conductor complete for Upper Carbon Holder complete (HL2613), including Flexible Cable, Bead Insulation, Contact Tips, Contact Screw and Carbon Clamp. For Types H, J, K, L, M and Q Headlights	HL2534	
Flexible Conductor with Bead Insulation and Contact Tip. For Types H, J, K, L, M and Q Headlights	HL2529	
Beads. For Flexible Conductors (HL2529, 2534) (per hundred)	HL530	
Flexible Cable. For Flexible Conductor (HL2145) (per foot)	HL146	
Flexible Cable. For Flexible Conductor (HL2534) (per foot)	HL529	
Contact Tip. For Flexible Conductor (HL2145)	HL147	
Contact Tip. For Flexible Conductor (HL2534)	HL531	
Carbon Clamp. For Flexible Conductor (HL2145)	HL149	
Carbon Clamp. For Flexible Conductor (HL2534)	HL534	
Magnet Coil with Yoke, Armature Block and Insulation. For Types A, B, C, D and P Headlights	HL2011	
Magnet Coil with Yoke Support and Insulation. For Types A, B, C, D and P Headlights	HL2010	
Magnet Coil with Yoke and Insulation. For Types H, J, K, L, M and Q Headlights	HL2624	
Magnet Coil only, for HL2010. For Types A, B, C, D and P Headlights	HL10	
Magnet Coil only, for HL2624. For Types H, J, K, L, M, and Q Headlights	HL2623	
Magnet Spool complete, including Core, Heads and Insulation. For Magnet Coil (HL10)	HL5658	
Magnet Spool complete, including Tube, Heads, Bushing and Insulation, for HL2623. For Types H, J, K, L, M and Q Headlights	HL2620	
Magnet Tube. For Magnet Spool (HL2620)	HL620	
Magnet Core. For Magnet Coil (HL10)	HL13	
Magnet Core. For Magnet Coil (HL2623)	HL615	
Magnet Wire. For Magnet Coil (HL10) (per pound)	HL18	
Magnet Wire. For Magnet Coil (HL2623) (per pound)	HL622	
Foot Piece. For Magnet Core (HL615)	HL616	
Porcelain Clutch. For Carbon Clutch Equipment (HL2032)	HL32	
Porcelain Clutch. For Carbon Clutch Equipment (HL2614)	HL614	
Metal Clutch. For Type M Headlight	HL5659	
Clutch Stop. For Type M Headlight	HL721	
Clutch Link. For Porcelain Clutch (HL32)	HL30	
Coil Spring. For Porcelain Clutches (HL32, 614)	HL34	
Guide Stem. For Coil Spring (HL34)	HL35	
Magnet Yoke. For Magnet Coil (HL10)	HL11	
Magnet Yoke. For Magnet Coil (HL2623)	HL526	
Support. For Magnet Coil (HL2623)	HL524	

Parts of above headlights, pages 98 to 105, inclusive.

Listings of Headlight Parts

For Types A, B, C, D, H, J, K, L, P, Q and M Headlights—Continued

Description	Catalog Number	Prices on Application
Rear Magnet Head. For Magnet Coils (HL10, 2623)	HL15	
Front Magnet Head. For Magnet Coil (HL10)	HL16	
Supporting Arm. For Types A, B, C, D and P Headlights	HL9	
Supporting Arm. For Types H, J, K, L, M and Q Headlights	HL508	
Frame. For Upper Carbon Holder (HL2020)	HL20	
Frame. For Upper Carbon Holder (HL2613)	HL613	
Globe Cap. For Upper Carbon Holders (HL2020, 2613)	HL22	
Globe Cap Spring. For Upper Carbon Holders (HL2020, 2613)	HL23	
Brace complete with Insulating Bushings, Sleeve, Screw and Insulator. For Upper Carbon Holder (HL2613)	HL2512	
Lower Carbon Holder complete, including Friction Wheel, Yoke with Pin, Coil Spring, Clamp Plate, Screws, Frame, Knurled Wheel and Shaft. For Types A, B, C, D and P Headlights	HL2039	
Lower Carbon Holder complete, including Friction Wheel, Yoke with Pin, Coil Spring, Clamp Plate, Frame, Knurled Wheel and Shaft and Carbon Set Screw. For Types H, J, K, L, M and Q Headlights	HL2604	
Friction Wheel. For Lower Carbon Holders (HL2039, 2604)	HL42	
Shaft. For Friction Wheel (HL42)	HL40	
Yoke with Pin. For Lower Carbon Holders (HL2039, 2604)	HL43	
Coil Spring. For Friction Wheel (HL42)	HL44	
Clamp Plate. For Friction Wheel (HL42)	HL45	
Frame. For Lower Carbon Holder (HL2039)	HL39	
Frame. For Lower Carbon Holder (HL2604)	HL604	
Knurled Wheel and Shaft. For Lower Carbon Holder (HL2039)	HL2507	
Knurled Wheel and Shaft. For Lower Carbon Holder (HL2604)	HL2505	
Knurled Wheel. For Lower Carbon Holders (HL2039, 2604)	HL41	
Base Plate. For Types A, B, C, D and P Headlights	HL1	
Base Plate. For Types H, J, K, L and Q Headlights	HL601	
Base Plate. For Type M Headlight.	HL501	
Lead Wire. For complete Mechanism (HL2500) (per foot)	HL104	
Terminal Binding Post complete with Porcelain Base, Mica Washer and necessary Screws and Washers. For Types A, B, C, D, H, J, K, L, M, P and Q Headlights	HL2003	
Porcelain Base. For Binding Post (HL2003)	HL502	
Pillar. For Binding Post (HL2003)	HL3	
Lamp Standard. For Types A, B, C, D, H, J, K, L, M, P and Q Headlights	HL6	
12-Inch Reflector Equipment complete, including Aluminum Reflector, Reflector Support, Stem, Bolt and necessary Fastening Screws and Nuts. For Types A and B Headlights.	HL5680	
12-Inch Reflector Equipment complete, including Aluminum Reflector, Reflector Support, Stem, Bolt and necessary Fastening Screws and Nuts. For Type P Headlight	HL5681	
12-Inch Reflector Equipment complete, including Aluminum Reflector, Reflector Support, Stem, Bolt and necessary Fastening Screws and Nuts. For Types H and J Headlights	HL5682	
12-Inch Reflector Equipment complete, including Aluminum Reflector, Reflector Support, Stem, Bolt and necessary Fastening Screws and Nuts. For Type Q Headlight	HL5683	
9-Inch Reflector Equipment complete, including Aluminum Reflector, Reflector Support (new style), Stem and necessary Fastening Screws and Nuts. For Type M Headlight	HL5699	
9-Inch Reflector Equipment complete, including Aluminum Reflector, Extension with two holes, Reflector Support (new style), Stem (new style), Bolt and necessary Fastening Screws and Nuts. For Type C Headlight	HL5684	
9-Inch Reflector Equipment complete, including Aluminum Reflector, Extension with one hole, Reflector Support (new style), Stem (new style), Bolt and necessary Fastening Screws and Nuts. For Type D Headlight	HL5685	
9-Inch Reflector Equipment complete, including Aluminum Reflector, Extension with two holes, Reflector Support (new style), Stem (new style) Bolt, and necessary Fastening Screws and Nuts. For Type K Headlight	HL5687	

Parts of above headlights, pages 98 to 105, inclusive.

Listings of Headlight Parts

For Types A, B, C, D, H, J, K, L, P, Q and M Headlights—Continued

Description	Catalog Number	Prices on Application
9-Inch Reflector Equipment complete, including Aluminum Reflector, Extension with one hole, Reflector Support (new style), Stem (new style), Bolt and necessary Fastening Screws and Nuts. For Type L Headlight	HL5686	
12-Inch Aluminum Reflector. For Types A and B Headlights	HL47	
12-Inch Aluminum Reflector. For Type P Headlight	HL135	
12-Inch Aluminum Reflector. For Types H and J Headlights	HL619	
12-Inch Aluminum Reflector. For Type Q Headlight	HL618	
9-Inch Aluminum Reflector. For Types C and D Headlights	HL183	
9-Inch Aluminum Reflector. For Types K and L Headlights	HL190	
9-Inch Aluminum Reflector. For Type M Headlight	HL503	
Reflector Support (old style). For 9-Inch Reflectors	HL181	
Reflector Support (new style). For 12-Inch Reflectors	HL5143	
Reflector Support (new style). For 9-Inch Reflectors	HL5698	
Reflector Stem (old style). For Reflectors (HL47, 135, 618, 619, 183, 190)	HL49	
Reflector Stem (new style). For Reflectors	HL5144	
Reflector Extension. For Reflector Equipments (HL5685, 5686)	HL178	
Reflector Extension. For Reflector Equipments (HL5684, 5687)	HL184	
Incandescent Lamp Fixture complete, including Lamp Receptacle, Lead Wire, Ground Wire and Fastening Bolts with Nuts. For Types A and H Headlights	HL2130	
Incandescent Lamp Fixture complete, including Lamp Receptacle, Lead Wire, Ground Wire and Fastening Screws. For Types C and K Headlights	HL2185	
Incandescent Lamp Receptacle. For Incandescent Lamp Fixture (HL2130)	HL674	
Incandescent Lamp Receptacle. For Incandescent Lamp Fixture (HL2185)	HL185	
Wire. For Incandescent Lamp Fixtures (HL2130, 2185) . . . (per foot)	HL130	
Incandescent Lamp Resistance complete, including 2 Resistance Coils, Connecting Strap, Base Plate, 2 Connecting Bolts with Nuts, 2 Caps and Binding Post. For 56-watt Lamp	HL2120	
Incandescent Lamp Resistance complete, including 4 Resistance Coils, 2 connecting Straps, Base Plate, 4 connecting Bolts with Nuts, 4 Caps and Binding Post. For 23-watt Lamp	HL5688	
Incandescent Lamp Resistance Coil only. For Incandescent Lamp Resistance (HL2120)	HL123	
Incandescent Lamp Resistance Coil only. For Incandescent Lamp Resistance (HL5688)	HL5689	
Wire. For Incandescent Lamp Resistance Coil (HL123) . . . (per pound, in less than pound lots)	HL5690	
Wire. For Incandescent Lamp Resistance Coil (HL123) . . . (per pound, in pound lots and over)	HL5690	
Wire. For Incandescent Lamp Resistance Coil (HL5689) . . . (per pound, in less than pound lots)	HL5692	
Wire. For Incandescent Lamp Resistance Coil (HL5689) . . . (per pound, in pound lots and over)	HL5692	
Connecting Strap. For Incandescent Lamp Resistances (HL2120, 5688)	HL124	
Base Plate. For Incandescent Lamp Resistance (HL2120)	HL122	
Base Plate. For Incandescent Lamp Resistance (HL5688)	HL5697	
Cap. For Incandescent Lamp Resistance Coils (HL123, 5689)	HL5040	
Porcelain Tube only. For Resistance Coils (HL123, 5689)	HL53	
One-Point Plug. For Types B, D, J and L Headlights	HL2103	
Two-Point Plug. For Types A, C, H, K, P and Q Headlights	HL2137	
Contact Tip. For Two-Point Plug (HL2137)	HL139	
Plug Point. For Plugs (HL2103, 2137) . . . (each)	HL102	
Handle. For One-Point Plug (HL2103)	HL103	
Handle. For Two-Point Plug (HL2137)	HL137	
Guard Spring. For One-Point Plug (HL2103)	HL5090	
Guard Spring. For Two-Point Plug (HL2137)	HL5089	
Wire. For One-Point Plug (HL2103) . . . (per foot)	HL104	

Parts of above headlights, pages 98 to 105, inclusive.

Listings of Headlight Parts

For Types A, B, C, D, H, J, K, L, P, Q and M Headlights—Continued

Description	Catalog Number	Prices on Application
Wire. For Two-Point Plug (HL2137) (per foot)	HL138	
Case complete with Door and Plain Glass in Door. For Types A and H Headlights	HL2064	
Case complete with Door and Plain Glass in Door. For Types B, J, P and Q Headlights	HL2065	
Case complete with Door and Plain Glass in Door. For Types C, D, K and L Headlights	HL2066	
Case complete with Door and Plain Glass. For Type M Headlight	HL2565	
Case complete, but without Door. For Types A, B, C, D, H, J, K, L, P and Q Headlights	HL2061	
Case complete, but without Door. For Type M Headlight	HL2550	
Case without Bottom Plate. For Type M Headlight	HL550	
Bottom Plate. For Case (HL2550)	HL551	
Door complete with Plain Glass. For Types A and H Headlights	HL2090	
Door complete with Plain Glass. For Types B, J, P and Q Headlights	HL2091	
Door complete with Plain Glass. For Types C, D, K and L Headlights	HL2170	
Door complete with Plain Glass. For Type M Headlight	HL2560	
Frame. For Doors (HL2090, 2091)	HL5963	
Frame. For Door (HL2170)	HL5964	
Frame. For Door (HL2560)	HL560	
Glass Holder Bracket. For Doors (HL2090, 2091, 2170)	HL95	
Glass Holder Bracket complete, including Spring, Lug, Rivet and Screw. For Door (HL2560)	HL2563	
Lug. For Glass Holder Bracket (HL2563)	HL563	
Spring for use with Glass Holder Brackets (HL95, 2563). For Doors (HL2090, 2091, 2170)	HL94	
Glass Holder Collar, fitted with Incandescent Lamp Fixture. For Door (HL2090)	HL2092	
Glass Holder Collar (new style). For Door (HL2091)	HL91	
Glass Holder Collar. For Door (HL2170)	HL177	
Steel Glass Holder Ring. For Door (HL2560)	HL564	
Plain Glass. For Doors (HL2090, 2091)	HL92	
Plain Glass. For Door (HL2170)	HL175	
Plain Glass. For Door (HL2560)	HL565	
Rubber Packing. For Glass (HL92)	HL97	
Rubber Packing. For Glass (HL175)	HL176	
Rubber Packing. For Glass (HL565)	HL566	
Hinge complete with Bolts. For all Cases	HL5083	
Hinge complete with Bolts. For Doors (HL2090, 2091, 2170)	HL66	
Hinge complete, including HL66, 68, 5083 and Screws and Nuts	HL6685	
Catch complete with Bolts. For all Cases	HL5084	
Hinge Pin and Catch Pin	HL68	
Catch Pin with Chain. For Type M Headlight	HL569	
Sliding Door with Knob, for Hand Hole. For Cases (HL2064, 2065 and 2066)	HL2079	
Bumper Screw complete, including Screw, Thumb Ring, Stud and Rubber Tip. For all Types of Headlights	HL2089	
Thumb Ring. For Bumper Screw (HL2089)	HL88	
Stud. For Bumper Screw (HL2089)	HL89	
Rubber Tip with Screw (HL86). For Bumper Screw (HL2089)	HL90	
Porcelain Bushing with Clamp and Clamping Screw, for Lead Wires. For Types A, B, C, D, H, J, K, L, Q, P and M Headlights	HL2553	
Old Style Bushing Clamp. For Types A, B, C, D, H, J, K, L, Q, P and M Headlights	HL82	
Porcelain Bushing. For HL2553	HL553	
Clamp complete with Screw and Nut. For Porcelain Bushing (HL2553)	HL554	
Front Leg. For Cases (HL2064, 2065, 2066)	HL62	
Handle. For Cases (HL2064, 2065, 2066)	HL5081	
Ventilator, (old style). For Cases (HL2064, 2065, 2066)	HL70	
Ventilator, (new style) (sheet steel). For Cases (HL2064, 2065, 2066)	HL6686	
Track for Mechanism. For Cases (HL2064, 2065, 2066) (each)	HL71	
Retaining Catch for Mechanism. For Cases (HL2064, 2065, 2066)	HL73	
Flat Spring. For Retaining Catch (HL73)	HL72	

Parts of above headlights, pages 98 to 105, inclusive.

Listings of Headlight Parts

For Types A, B, C, D, H, J, K, L, P, Q and M Headlights—Continued

Description	Catalog Number	Prices on Application
Screws, Bolts, Nuts, Metal Washers and Cotter Pins—Continued		
Screw. For fastening Magnet Yoke (HL526) to Magnet Support (HL524); for fastening Lower Carbon Holders (HL2039, 2604) to Supporting Arms (HL9, 508); for fastening Standard to Base Plate; for Glass Holder Bracket (HL95) and for fastening Hinge Pin Chain to Case (HL2550) (per dozen)	HL7	
Screw. For fastening Magnet Coil Support (HL524) to Upper Carbon Holder (HL2613) (per dozen)	HL525	
Screw. For fastening Reflector to Stem (old style) (per dozen)	HL48	
Screw. For fastening Flexible Conductor (HL2529) to Magnet Yoke (HL526) (per dozen)	HL2	
Screw. For fastening Clamp Plate (HL45) to Lower Carbon Holders (HL2039, 2604) (per dozen)	HL46	
Screw. For Bottom Plate (HL551) (per dozen)	HL552	
Cap Screw. For attaching Turret Base to Type M Headlight . (each)	HL544	
Screw. For Retaining Plate (HL543) (per dozen)	HL542	
Screw. For Glass Holder Bracket (HL2563) (per dozen)	HL561	
Adjusting Screw with Nut. For Armature Block (HL25) . (per dozen)	HL27	
Adjusting Screw. For Magnet Coil (HL2623) (per dozen)	HL527	
Pivot Screw. For Angle Lever (HL29) (each)	HL26	
Link Screw. For Angle Lever (HL29) (each)	HL31	
Screw. For fastening Pillar (HL3) to Porcelain Base (HL502) (per dozen)	HL4	
Contact Screw. For Pillar (HL3) (per dozen)	HL5	
Contact Screw. For fastening Flexible Conductor (HL2529) to Carbon Clamp (HL534) (per dozen)	HL532	
Contact Screw. For fastening Flexible Conductor (HL2145) to Upper Carbon Holder (HL2020) (per dozen)	HL148	
Fastening Screw. For Incandescent Lamp Fixture (HL2185) (per dozen)	HL186	
Screw. For fastening Rubber Tip to Bumper Screw . . . (per dozen)	HL86	
Screw with Nut. For fastening Reflector, Reflector Supports (HL5143, 5698) (new style) and Reflector Stem (HL5144) (new style) to Lamp Standard (per dozen)	HL5694	
Connecting Bolt with Nut. For Reflector Support (HL181) (per dozen)	HL179	
Bolt with Nut. For fastening Handle (HL5081), Hinge (HL66), Catch (HL5084), Insulated Clamp (HL131), Retaining Catch (HL73), Lamp Hanger (HL87) and Front Leg (HL62) to Case (HL2061) . (per dozen)	HL65	
Bolt with Nut. For fastening Incandescent Lamp Resistance Coil to Incandescent Lamp Resistance Base Plate (per dozen)	HL125	
Metal Washer. For Screw (HL4); for Yoke Fastening Screws (HL19); for Brace Fastening Screw (HL8); for Upper Carbon Holder Fastening Screws (HL8), and for Flexible Conductor Contact Screw (HL532) (per dozen)	HL17	
Metal Washer. For Coil Spring (HL34) (per dozen)	HL28	
Metal Washer. For Plug Point (HL102) (per dozen)	HL107	
Metal Washer. For Pillar (HL3) (per dozen)	HL163	
Metal Bushing. For Magnet Tube (HL620)	HL623	
Cotter Pin. For Clutches (HL32, 614, 5659) (per dozen)	HL33	

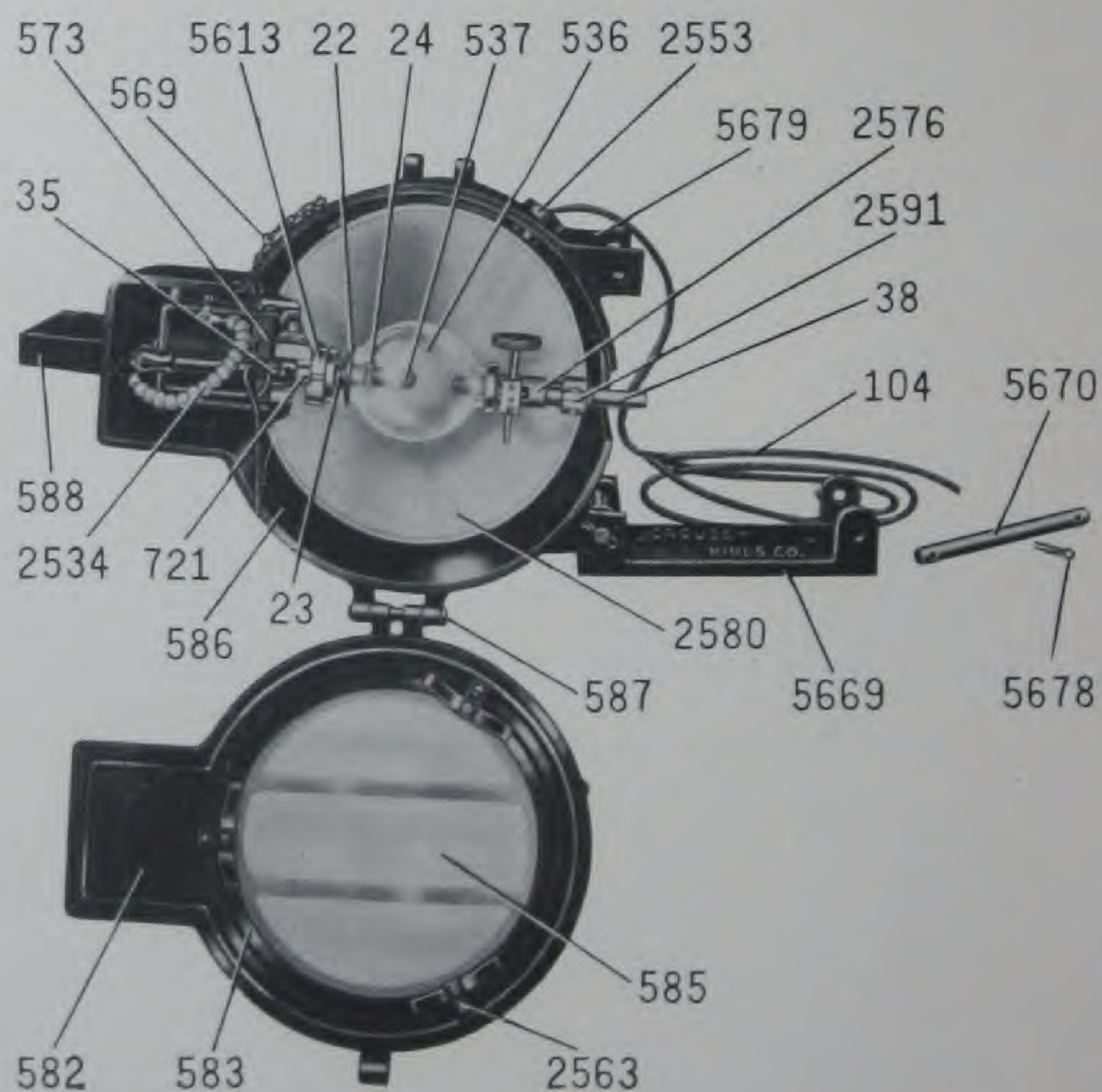
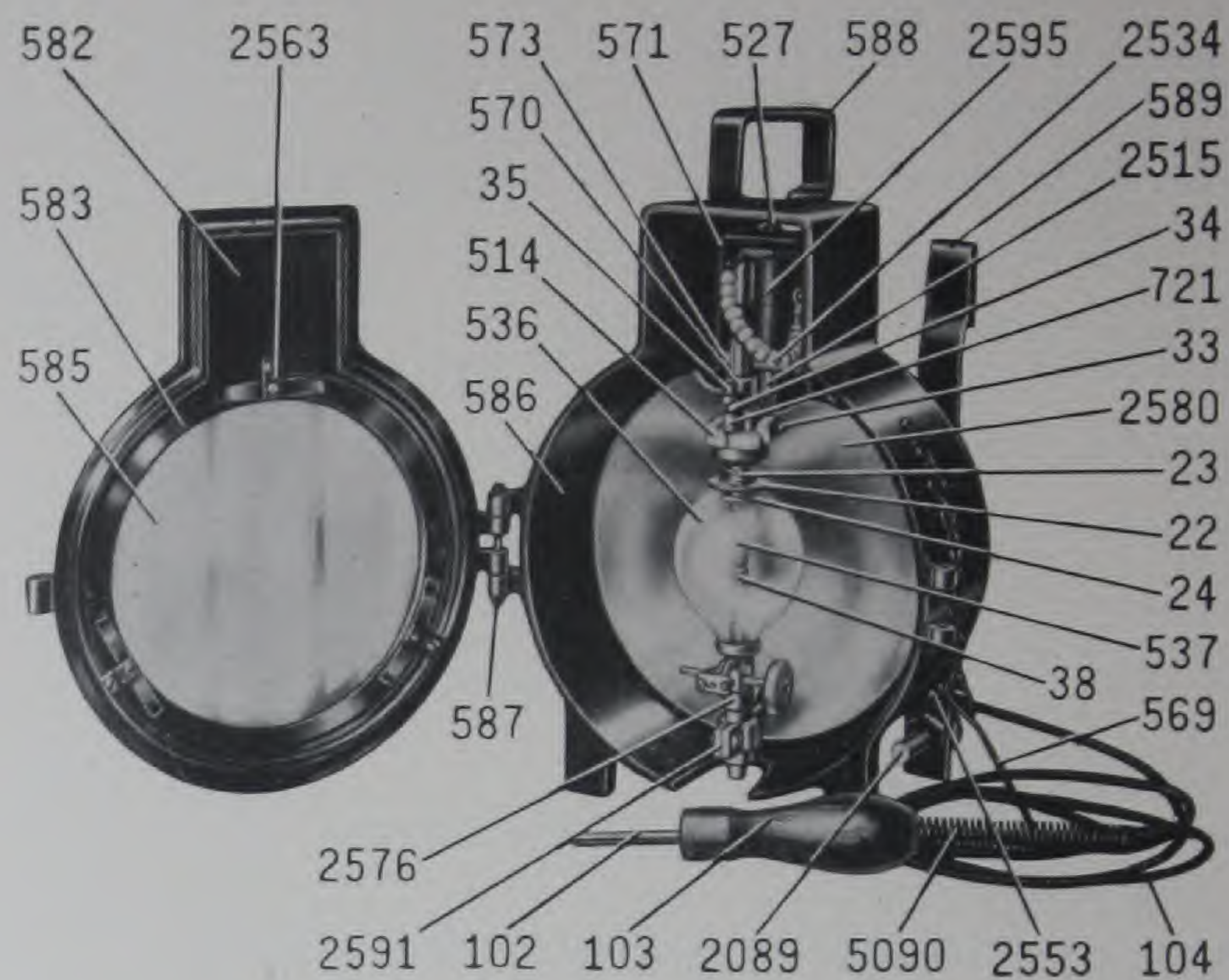
Mica Washers, Insulation and Bushings

Mica Washer. For Screw (HL4); for Yoke Fastening Screws (HL19), and for Brace Fastening Screw (HL8) (per dozen)	HL158	
Mica Washer. For Magnet Head (HL15) (per dozen)	HL5695	
Mica Washer. For Magnet Head (HL16) (per dozen)	HL160	
Mica Insulation. For Yoke (HL11) (per dozen)	HL156	
Mica Insulation. For Upper Carbon Holder (per dozen)	HL157	
Mica Insulation. For Brace (HL2512) (per dozen)	HL509	
Mica Bushing. For Supporting Arm (per dozen)	HL276	
Micanite Tubing. For Magnet Core (HL13) (per dozen)	HL12	
Micanite Tubing. For Magnet Tube (HL620) (per dozen)	HL621	
Mica Insulation. Between Yoke (HL526) and Case (HL2550) (per dozen)	HL5696	

Parts of above headlights, pages 98 to 105, inclusive.

Headlight Parts

For Types V and VR Headlights



Listings of parts for above headlights, pages 107 to 109, inclusive.

Listings of Headlight Parts—For Types V and VR Headlights

Description	Catalog Number	Prices on Application
Upper Carbon Mechanism complete, including Carbon Clutch Equipment, Movable Magnet Core and Foot, Flexible Conductor, Upper Carbon Holder, Magnetic Coil with Yoke and Support for Upper Carbon Mechanism. For 4-Ampere, 575-Volt, Type V Headlight . . .	HL5660	
Upper Carbon Mechanism complete, including Carbon Clutch (Porcelain) Equipment, Movable Magnet Core and Foot, Flexible Conductor, Upper Carbon Holder, Magnetic Coil with Yoke and Support for Upper Carbon Mechanism. For 2-Ampere, 575, 550 or 250-Volt, Type V Headlight . . .	HL2574	
Upper Carbon Mechanism complete, including Carbon Clutch (Metal) Equipment, Movable Magnet Core and Foot, Flexible Conductor, Upper Carbon Holder, Magnetic Coil with Yoke and Support for Upper Carbon Mechanism. For 2-Ampere, 550 or 250-Volt, Type VR Headlight . . .	HL5661	
Upper Carbon Holder complete, including Globe Cap, Globe Cap Spring, Split Nut, Guide Stem, Frame, Carbon Clutch Equipment and Movable Magnet Core with Foot. For Type V Headlight . . .	HL2570	
Upper Carbon Holder complete, including Globe Cap, Globe Cap Spring, Split Nut, Guide Stem, Frame, Carbon Clutch Equipment and Movable Magnet Core with Foot. For Type VR Headlight . . .	HL5615	
Carbon Clutch Equipment complete, including Washer, Cotter Pin, Coil Spring and Porcelain Clutch. For Type V Headlight . . .	HL2514	
Carbon Clutch Equipment complete, including Washer, Cotter Pin, Coil Spring and Metal Clutch. For Type VR Headlight . . .	HL5610	
Movable Magnet Core with Foot. For Types V and VR Headlights . . .	HL2515	
Flexible Conductor with Bead Insulation and Contact Tip. For Types V and VR Headlights . . .	HL2529	
Beads. For Flexible Conductor (HL2534) (per hundred)	HL530	
Contact Tip. For Flexible Conductor (HL2534)	HL531	
Wire. For Flexible Conductor (HL2534) (per foot)	HL529	
Contact Terminal. For Flexible Conductor (HL2534)	HL6687	
Carbon Clamp with Flexible Conductor (HL2529). For Types V and VR Headlights	HL2534	
Magnet Coil with Yoke, Adjusting Screw, Nut and Flexible Conductor. For 4-Ampere, 575-Volt, Type V Headlight	HL5662	
Magnet Coil with Yoke, Adjusting Screw, Nut and Flexible Conductor. For 2-Ampere, 575-Volt, Type V and 2-Ampere, 550 or 250-Volt, Types V and VR Headlights	HL2571	
Support for Upper Carbon Mechanism complete, including Frame, Bushings and Insulation. For Types V and VR Headlights	HL2573	
Lower Carbon Holder complete, including Friction Wheel, Yoke with Pin, Coil Spring, Clamp Plate, Frame and Knurled Wheel with Shaft. For Types V and VR Headlights	HL2576	
Support with Screws and Nuts. For Lower Carbon Holder (HL2576)	HL2591	
Knurled Wheel and Shaft. For Lower Carbon Holder (HL2576)	HL5611	
Insulation Block complete with Terminal Screws, Nuts and Washers, for Terminal Lead Wires. For Types V and VR Headlights	HL5047	
Old Style Insulation Block with Binding Post.	HL2581	
Magnet Coil only. For 4-Ampere, 575-Volt, Type V Headlight.	HL2623	
Magnet Coil only. For 2-Ampere, 575-Volt, Type V and 2-Ampere, 550 or 250-Volt, Types V and VR Headlights	HL2595	
Magnet Wire. For Magnet Coil (HL2623) (per pound)	HL622	
Magnet Wire. For Magnet Coil (HL2595) (per pound)	HL5207	
Porcelain Carbon Clutch. For Type V Headlight	HL514	
Metal Carbon Clutch. For Type VR Headlight	HL5613	
Globe Cap. For Upper Carbon Holder complete (HL2570)	HL22	
Globe Cap Spring. For Upper Carbon Holder complete (HL2570)	HL23	
Spring. For Clutches (HL514, 5613)	HL34	
Guide Stem. For Spring (HL34)	HL35	
Clutch Stop. For Spring (HL34)	HL721	
Frame. For Upper Carbon Holder (HL2570)	HL570	
Yoke. For Magnet Coil (HL2595)	HL571	
Frame. For Support (HL2573)	HL573	
Lead Wire (per foot)	HL104	

Parts of above headlights, pages 106 to 109, inclusive.

Listings of Parts—For Types V and VR Headlights

Description	Catalog Number	Prices on Application
Frame. For Lower Carbon Holder (HL2576)	HL576	
Reflector Equipment, including Reflector Frame, Reflector and Fastening Screw. For Types V and VR Headlights	HL2580	
Form. For Reflector Equipment (HL2580)	HL579	
8-Inch Aluminum Reflector	HL580	
Support only. For Support complete (HL2591)	HL591	
Porcelain Bushing with Clamp and Clamping Screw. For Lead Wires.	HL2553	
Porcelain Bushing. For HL2553	HL553	
Clamp complete with Screw and Nut. For HL2553	HL554	
One-Point Plug. For Types V and VR Headlights	HL2103	
Plug Point. For Plug (HL2103)	HL102	(each)
Handle. For One-Point Plug (HL2103)	HL103	
Guard Spring. For One-Point Plug (HL2103)	HL5090	
Case complete with Door. For Type V Headlight	HL2590	
Case complete with Rocker Base and Door with Plain Glass. For Type VR Headlight	HL5666	
Case complete, but without Door. For Type V Headlight	HL2589	
Case complete with Rocker Base, but without Door. For Type VR Headlight	HL5667	
Case complete without Rocker Base and Door. For Type VR Headlight	HL5668	
Door complete with Plain Glass. For Types V and VR Headlights	HL2582	
Rocker Base. For Type VR Headlight	HL5669	
Pin. For Rocker Base (HL5669)	HL5670	
Glass Holder Bracket complete, including Spring, Lug, Rivet and Screw. For Door (HL2582)	HL2563	
Spring. For Glass Holder Bracket (HL2563)	HL94	(each)
Lug. For Glass Holder Bracket (HL2563)	HL563	(each)
Catch Pin with Chain	HL569	
Frame. For Door (HL2582)	HL582	
Glass Holder Ring. For Door (HL2582)	HL583	
Rubber Packing. For Glass (HL585)	HL584	
Clear Glass. For Door (HL2582)	HL585	
Cast-Iron Case only	HL586	
Turret Base complete. For Type VR Headlight	HL5671	
Base Plate. For Turret Base (HL5671)	HL5672	
Top Plate. For Turret Base (HL5671)	HL5673	
Retaining Plate. For Top Plate (HL5673)	HL543	
Plunger complete, including Plunger (HL545), Plunger Collar (HL5674) Plunger Spring (HL5675) and Plunger Bracket (HL5677). For Turret Base (HL5671)	HL5153	
Plunger. For Plunger complete (HL5153)	HL545	
Plunger Collar. For Plunger complete (HL5153)	HL5674	
Plunger Spring. For Plunger complete (HL5153)	HL5675	
Plunger Bracket, screws to back of Case (HL5638). For Plunger complete (HL5153)	HL5677	
Bumper Screw complete, including Screw, Thumb Ring, Stud and Rubber Tip. For Types V and VR Headlights	HL2089	
Thumb Ring. For Bumper Screw (HL2089)	HL88	
Stud. For Bumper Screw (HL2089)	HL89	
Rubber Tip with Screw (HL86). For Bumper Screw (HL2089)	HL90	
Handle. For Case (HL2589)	HL588	
Lamp Hanger. For Case (HL2589)	HL589	
Back Leg. For Case (HL5667)	HL5679	
Clear Glass Globe. For Types V and VR Headlights (per dozen)	HL536	
	HL536	(in gross lots)
Opalescent Glass Globe. For Types V and VR Headlights (per dozen)	HL539	
	HL539	(in gross lots)
Upper Carbon (6 x 3/8 inches). For Types V and VR Headlights (per 100)	HL537	
	HL537	(in standard package quantities of 200)
Lower Carbon (4 1/2 x 3/8 inches). For Types V and VR Headlights (per 100)	HL38	
	HL38	(in standard package quantities of 200)

Parts of above headlights, pages 106 to 109, inclusive.

Listings of Parts—For Types V and VR Headlights

Screws, Bolts, Nuts, Cotter Pins, Asbestos Tubing and Mica Insulation

Description	Catalog Number	Prices on Application
Adjusting Screw. For Magnet Coil (HL2623) (per dozen)	HL527	
Cap Screw. For Reflector Equipment (HL2580) (per dozen)	HL578	
Contact Screw. For Support (HL2573) (per dozen)	HL590	
Screw. For Catch Pin with Chain (HL569) (per dozen)	HL7	
Screw. For Glass Holder Bracket (HL2563) (per dozen)	HL561	
Screw. For Handle (HL588), Lamp Hanger (HL589) and Back Leg (HL5679) (per dozen)	HL8	
Screw with Nut. For Upper Carbon Mechanisms complete (HL5660, 2574, 5661) (per dozen)	HL5612	
Screw. For Support (HL2573) (per dozen)	HL19	
Hinge Bolt with Nut. For Case (HL2589) (per dozen)	HL587	
Lock Nut. For Bumper Screw (HL2089) (each)	HL5093	
Split Nut. For Globe Cap (HL22)	HL24	
Cotter Pin. For Clutches (HL514, 5613) (per dozen)	HL33	
Cotter Pin. For Pin (HL5670) (per dozen)	HL5678	
Asbestos Tubing Insulation (per foot)	HL572	
Mica Insulation. For Support (HL2573)	HL574	
Mica Washer. For Screw (HL19) (per dozen)	HL158	
Insulating Bushing. For Support (HL2573) (per dozen)	HL276	

Parts of above headlights, pages 106 to 109, inclusive.

Imperial Luminous Arc Headlight for Interurban Service



Type LAA Installed

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CROUSE-HINDS

IMPERIAL INCANDESCENT HEADLIGHTS

For Railway and Mining Service

PATENTS ISSUED AND PENDING
IN UNITED STATES AND CANADA

CATALOG No. 202

EFFECTIVE JULY 15, 1915
REVISED APRIL 15, 1917



Crouse-Hinds Company is the exclusive licensee to manufacture Incandescent Headlights and Switches under certain pending applications and the following U. S. Letters Patent, viz.:

No. 916266	March 23, 1909
No. 1012806	Dec. 26, 1911
No. 1057409	April 1, 1913
No. 1136404	April 20, 1915
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No. 1162974	Dec. 7, 1916
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Crouse-Hinds Company

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Crouse-Hinds Imperial Incandescent Headlights



Type WBF Headlight Installed

Selection of a Proper Incandescent Headlight

The following pages list the most extensive line of incandescent headlights ever cataloged by a single manufacturer. These headlights include types to meet the requirements of the most exacting operating men. This is so because of the wide choice offered and because the high mechanical standard which has always been the distinguishing feature of Crouse-Hinds products is maintained uniformly in its headlights.

HEADLIGHT SERVICE

Headlight service is divided into four classes, each marked by different service requirements, as follows:

City Service—Slow speed.

City and Suburban Service—Moderate speed.

Interurban Service—High speed.

Mining Service—Slow and moderate speed.

Each of these classifications calls for a different style of headlight. In the following paragraphs these classifications are dealt with separately and the headlights which are suitable for each service are enumerated.

City Service

In ordinary city service, electric cars, as a rule, operate on well-lighted streets and, therefore, a very powerful headlight is not required for the safe operation of cars, and, again, a powerful headlight tends to blind pedestrians and drivers of vehicles. The prime object of a headlight for this service is to provide a warning of the car's approach and to illuminate switch points. For this class of service, the Crouse-Hinds Company's types W, Z, ZB, ZP, ZW and the Syracuse Changeable headlights, (see pages 8 to 19 inclusive), each with regular filament Mazda lamps, will be found entirely satisfactory.

For city service lines that extend somewhat into the suburbs, any of the above mentioned headlights will, when equipped with focus type Mazda lamps, furnish adequate illumination.

It is usual to wire the headlights of this class in series with one group of lights in the car. In the case of double end cars, the cab light and the headlight are wired to a three-way switch, in order that the cab may be dark and the headlight lighted at the front end of the car, and vice versa for the rear end of the car.

City and Suburban Service

In our larger cities, some of the cars run from the main business center to the out-lying suburban districts. These cars require a more powerful headlight to illuminate the right-of-way, because suburban streets and roads are usually poorly lighted. For this service, the right degree and quality of illumination depends upon the speed of the car, the general illumination and the density of traffic. To meet the conditions of this service, the Crouse-Hinds Company has developed the following types of headlights: WBS, WBF, WCS, WCF, WDS, WDF, MBS and MBF, (see pages 20 to 33 inclusive), all of which are designed to take focus type Mazda lamps of 23-94 watts, 105-130 volts, or any other lamps of less than 100 watts in G-25 bulbs or smaller.

The track illumination with any of these headlights will be from 400 to 700 feet, depending upon the wattage of the headlight lamp. It is customary with lamps of 56 watts or less to wire the headlight in series with a single circuit of car lights, but when a 72 or 94-watt lamp is used in the headlight, it is best practice to wire the headlight in series with an external resistance, in order that an additional resistance may be cut in series with the headlight, to dim it when operating on city streets. Each of these headlights will accommodate any regular filament Mazda lamp in an S-21 bulb or smaller, but the resultant illumination with these regular filament lamps is naturally much less than is obtained by using focus type lamps.

Interurban Service

Interurban service requires a larger and more powerful headlight than either city or suburban service, because interurban cars operate at higher rates of speed and, for the most part, along highways or private right-of-ways where no other illumination is provided. It is desirable that the headlight illuminate the track a sufficient distance ahead of the car to enable the motorman to see an obstruction and stop the car before striking it, and, also, to warn vehicles approaching on intersecting highways. To meet the exacting conditions of this high speed service, the Crouse-Hinds Company's Imperial incandescent headlights types SAP, SAS, SCP, SCS, SDP and SDS, all with 12-inch reflectors, and type SDP, of a larger size and having a 16-inch reflector, (see pages 34 to 39, inclusive) are especially recommended. These headlights illuminate the track from 800 to 1,500 feet ahead of the car, the distance depending upon the incandescent lamp used with the headlight.

Types SAP, SAS, SCP, SCS, SDP and SDS (12-inch) headlights will take any incandescent lamp of 250 watts or less in a G-30 bulb or smaller and type SDP (16-inch) will take any lamp of 500 watts or less in a G-40 bulb or smaller.

Mining Service

Perhaps the most severe requirements that a headlight has to meet are those which apply to mining service. Foremost among these requirements is mechanical strength, to withstand the very hard usage to which all mining material is subjected. This point of mechanical strength is the outstanding feature of all Imperial mine headlights manufactured by the Crouse-Hinds Company and it is secured without in any way sacrificing illuminating efficiency. The combination of high illuminating efficiency and great mechanical strength makes Crouse-Hinds headlights superior to all others.

Mining service is divided into two main classes, as follows:

Gathering Service—Slow speed.

Main Haulage Service—Moderate speed.

Gathering Service

In gathering service, a small headlight is used. Here no great amount of illumination is called for, as the sole requirements are for a marker on the locomotive and just sufficient illumination for coupling. In fact, too strong a light is objectionable on account of its dazzling the eyes of the miners. Imperial incandescent headlight type I (see page 41) is designed for this service. The headlights of gathering locomotives are kept burning continuously, and it is customary to use regular filament lamps of half the trolley voltage, and to wire the two headlights in series. If special conditions warrant the use of a more powerful headlight, type MD Imperial incandescent headlight will give the desired results.

Main Haulage Service

For main haulage locomotives, types MC and MD Imperial incandescent headlights (see pages 42 and 43) are particularly recommended. These headlights are made with both pressed steel and cast-iron cases, and are designed for rough use in mines.

Type MC headlight will accommodate any focus type lamp of 23 to 94 watts in a G-25 bulb or smaller, or any regular filament lamp in an S-21 bulb or smaller. With this headlight in service, the entire run-way of the mine is illuminated for a distance of 400 to 700 feet ahead of the locomotive, depending upon the incandescent lamp used.

Type MD headlight is a small, compact headlight with a 6½-inch reflector, and was designed especially to take a 25-watt, 24-volt Mazda lamp with bayonet joint socket No. 1100. The lamp resistance is contained in the headlight case.

Selection of a Proper Reflector

All reflectors used in Crouse-Hinds Imperial incandescent headlights are true paraboloids.

A paraboloid is the surface generated by rotating a parabola about its axis, and reflectors designed thus are commonly called parabolic reflectors. All light emanating from the exact focal point of a parabolic reflector and impinging on its specular surface is reflected parallel to the axis. This ideal condition would result in a beam of light of the same diameter as the reflector.

A perfectly parallel beam of light, however, would not be satisfactory for headlight work, since the area illuminated would be too small. In practice, a beam of this nature is not obtained, because all light sources have finite dimensions, causing a slight dispersion or spread of the beam, and this spread is necessary for the proper illumination of the track. On the other hand, the light source must be kept as small as possible in order that the spread may not be too great.

Sterling, Crystal and Gold Rays

Crouse-Hinds Imperial incandescent headlights may be equipped with various reflectors and lenses by means of which three different qualities of illumination may be obtained, as follows:

STERLING RAY—Illumination secured by using either a polished nickel-plated copper reflector or a polished aluminum reflector.

CRYSTAL RAY—Illumination secured by using a crystal glass mirror reflector or a crystal glass semaphore lens.

GOLD RAY—Illumination secured by using a gold glass mirror reflector, a "Noglare" glass semaphore lens or a "Noglare" front door glass in conjunction with polished metal or crystal glass mirror reflector.

The Crouse-Hinds Company equips its headlights with various reflectors and leaves the selection to the customer. The following tabulation gives the relative properties of each. The best reflector from the customer's standpoint is placed at the top of each column.

Coefficient of Reflection	Permanency	First Cost
Crystal Glass	Crystal Glass	Aluminum
Gold Glass	Gold Glass	Nickel-Plated Copper
Nickel-Plated Copper	Nickel-Plated Copper	Crystal Glass
Aluminum	Aluminum	Gold Glass

Metal Reflectors

All metal reflectors used in Crouse-Hinds Imperial incandescent headlights are spun over accurate, metal forms, and are true paraboloids. The plating and polishing are done by skilled operatives of long experience. As a result, first quality work is uniformly secured.

Glass Reflectors

The glass reflectors used in Crouse-Hinds Imperial incandescent headlights are manufactured from imported optical glass of the highest quality. The glass blanks are put through a special annealing process to insure toughness and prevent cracking from heat intensity. They are **ground to form on both sides**, thus insuring the correct shape.

The silvering is put on by a patented high temperature process and will not peel, flake off or tarnish. It is protected from corrosion and abrasion by several weather-proof coatings.

Regular reflection depends upon **surface polish**, and all glass reflectors used in Crouse-Hinds headlights are **ground, buffed and polished on both surfaces**.

Selection of a Proper Headlight Lamp

The selection of a headlight lamp depends upon the trolley voltage and the ease and economy with which it may be subdivided to meet conditions. For the main part, railways have a trolley voltage of from 500 to 600 volts. For ordinary city service or suburban service, it is customary, and perfectly satisfactory, to use the same voltage and wattage lamp in the headlight as is used in the car, or, if a more powerful headlight is desired, the wattage of the headlight lamp may be double that of the car lamps and the headlight may be operated in series with two groups of car lights in parallel.

Best results are obtained by using low voltage lamps, because, as the filaments are shorter and can be wound in a smaller space, the light source can be placed much nearer the focal point of the reflector.

Usually it is not possible to use the extremely low voltage lamps, such as 5½ to 6-volt lamps, because it is not economical to reduce the line voltage to the lamp voltage by means of a dead resistance. For interurban headlights, it is, therefore, necessary to select a lamp, which has a current rating of 5-ampere or less. On 600 volts, this means that the headlight and its dead resistance will consume not over three kilowatts. While it is sometimes possible to operate these high powered headlights in series multiple with the car lights, it is better to use a dead resistance so that the headlight circuit will be entirely independent of the car lights and, also, so that an additional resistance may be cut in for dimming the headlight when the car is operating within a city.

Incandescent Lamps

Incandescent lamps that can be used in Crouse-Hinds Imperial incandescent headlights are as follows:

Watts	Volts	*Light Center Length	Bulb	Base	Filament	**Type	List Price Each
23	105-130	2¼ ₁₆	G-18½	Med. Screw	Focus Type	B	\$.65
25	24	1¾	G-16½	No. 1100	Focus Type	B	.60
36	105-130	2¼ ₁₆	G-18½	Med. Screw	Focus Type	B	.65
46	105-130	2¼ ₁₆	G-25	Med. Screw	Focus Type	B	.70
56	105-130	2¼ ₁₆	G-25	Med. Screw	Focus Type	B	.70
72	105-130	2¼ ₁₆	G-25	Med. Screw	Focus Type	B	.90
94	105-130	2¼ ₁₆	G-25	Med. Screw	Focus Type	B	1.10
100	105-130	2¾	G-25	Med. Screw	Focus Type	C	1.35
100	30-34	2¾	G-25	Med. Screw	Focus Type	C	1.50
150	105-130	2¾	G-25	Med. Screw	Focus Type	C	2.00
150	30-34	2¾	G-25	Med. Screw	Focus Type	C	2.00
250	30-34	3⅛	G-30	Med. Screw	Focus Type	C	3.00
180	90	3⅛	G-30	Med. Screw	Focus Type	C	2.50
250	105-130	3⅛	G-30	Med. Screw	Focus Type	C	2.70
320	80	4¼	G-40	Mogul Screw	Focus Type	C	4.00
500	105-130	4¼	G-40	Mogul Screw	Focus Type	C	4.50
36	5½-6	2¼	G-18½	Med. Screw	Focus Type	C	1.25
72	5½-6	2¾	G-25	Med. Screw	Focus Type	C	1.50
108	5½-6	3⅛	G-30	Mogul Screw	Focus Type	C	1.75

*Distance in inches from center of filament to cap base of lamp.

**Type B—Vacuum bulb lamps. Type C—Gas filled lamps.

The above information is the latest obtainable from the lamp manufacturers, but the Crouse-Hinds Company does not guarantee the prices or other data. Complete information as given above should be placed on each requisition for lamps to the jobber, and, in every case, it should be specified whether the lamps are for series or for multiple burning and that the lamps are to be used in headlights.

MOUNTING OF LAMPS

Some operating departments prefer the lamp mounted horizontally, while others favor the vertical mounting. In all city and suburban and interurban types of incandescent headlights manufactured by the Crouse-Hinds Company, the customer has the choice of either of these two forms of mounting and also of a 30-degree angle lamp mounting.

Horizontal Mounting

Horizontal mounting of the lamp presents, as a rule, a neat appearance. This mounting also utilizes the greater percentage of the total light flux emitted by the light source. When the lamp is mounted in this position, the smallest hole is cut in the reflector, and this hole is in the most inefficient part. This type of mounting, however, permits the lamp filament to sag.

Vertical Mounting

The vertical mounting of the lamp has the advantage that the lamp filament is supported directly on its anchors, and there is no tendency for the filament to sag. If the lamp is not mounted true on the dash, the beam can be leveled on the track by raising or lowering the lamp. The focusing mechanism provides the means for this adjustment. The vertical position, also, is best from the standpoint of lamp life, but, as noted above, the illumination is slightly less than is obtained when the lamp is mounted horizontally.

Angle Mounting

The 30-degree angle mounting of the incandescent lamp is a compromise between the horizontal and the vertical mountings and has some of the advantages of each, in that the filament is supported directly by its anchors and, also, a greater percentage of the light flux is utilized than in the case of the vertical mounting, but not so much as in the case of the horizontal mounting. If the lamp is not mounted true on the dash, the beam can be leveled on the track by raising or lowering the lamp. The focusing mechanism provides the means for this adjustment.

FOCUSING OF LAMPS

The most important consideration in the effectiveness of a headlight beam, is to have the light source located at the focal point of the reflector. Focus type Mazda lamps are apt to vary in the length of their light centers, and it is, therefore, necessary that the lamp receptacle be adjustable, so that the lamp filament may be located at the focal center of the parabolic reflector.

All Crouse-Hinds Imperial incandescent headlights, with which focus type lamps are used, have focusing mechanisms which permit adjustment of the lamp receptacle along the axis of the lamp itself.

These focusing mechanisms are simple and easily operated, and will not jar loose due to vibration incident to car service.

In order to focus the headlight, the car should be put on a straight, level track as free as possible from other illumination, and then adjust the incandescent lamp until the narrowest beam of light is obtained. This will give the best track illumination. Another method is to throw the beam of light on a wall two or three hundred feet distant and move the lamp until the smallest illuminated spot is obtained. In the case of portable headlights, the beam of light may be thrown up into the air and the lamp position changed until the rays of light are concentrated in the smallest angle. A little practice will enable the operator to focus the lamp quickly and accurately.

Imperial Incandescent Headlight for City Service

Type W—Surface Mounting

Takes 23 to 56-Watt Regular Filament or 23 to 94-Watt Focus Type Mazda Lamp

Type W headlight is for surface mounting on dash and is secured in position by six bolts.

Both case and door are cast iron, finished in weather-proof black enamel. The lower portion of the case is arranged as a guard, which prevents the trolley rope from catching on the headlight. The door is hinged at the top, so as to close by gravity, and is held shut by a spring catch.

The headlight is listed with the following reflectors: polished aluminum, white enameled steel and nickel-plated copper, all of which are true paraboloids.

The headlight is listed with clear glass or semaphore lens in door, but, if desired, will be furnished with grid or guard door, which affords protection to the glass and semaphore lens, respectively, and are interchangeable with the plain and regular semaphore lens doors.

Type W headlight will fit any standard car dash whose radius of curvature is 5 to 7 feet.



With Clear Glass in Plain Door
Front View



Side View



With Grid Door



With Clear Semaphore Lens in Regular Door
Front View



Side View



With Semaphore Lens and Guard Door

Alternative Adjustment

The standard adjustment for this headlight is for a 23 to 56-watt regular filament Mazda lamp. If specified on the order, the headlight will be equipped with a receptacle adjusted for 23 to 94-watt focus type Mazda lamp.

Imperial Incandescent Headlight for City Service

Type W—Surface Mounting

Takes 23 to 56-Watt Regular Filament or 23 to 94-Watt Focus Type Mazda Lamp

With Clear Glass in Plain Door Cast-Iron Case

Diameter Reflector	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
8 ³ / ₄ Inches	Headlight with Polished Aluminum Reflector	24093	30 lbs.	\$6.40
	Headlight with White Enameled Steel Reflector	24901	30 lbs.	6.40
	Headlight with Nickel-plated Copper Reflector	28531	30 lbs.	7.00

With Clear Glass in Grid Door Cast-Iron Case

Diameter Reflector	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
8 ³ / ₄ Inches	Headlight with Polished Aluminum Reflector	24095	30 lbs.	\$6.80
	Headlight with White Enameled Steel Reflector	24903	30 lbs.	6.80
	Headlight with Nickel-plated Copper Reflector	28643	30 lbs.	7.40

With Clear Semaphore Lens in Regular Door Cast-Iron Case

Diameter Lens	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
8 ³ / ₈ Inches	Headlight with Polished Aluminum Reflector	24097	33 lbs.	\$8.45
	Headlight with White Enameled Steel Reflector	24905	33 lbs.	8.45
	Headlight with Nickel-plated Copper Reflector	28532	33 lbs.	9.05

With Clear Semaphore Lens in Guard Door Cast-Iron Case

Diameter Lens	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
8 ³ / ₈ Inches	Headlight with Polished Aluminum Reflector	24909	33 lbs.	\$8.95
	Headlight with White Enameled Steel Reflector	24913	33 lbs.	8.95
	Headlight with Nickel-plated Copper Reflector	28644	33 lbs.	9.45

Net weight—With clear glass in door, 20 pounds; with semaphore lens in door, 23 pounds. Shipping dimensions: 19 x 14 x 10 inches.

If specified on the order, any of the following colored glasses or lenses will be furnished with above headlights at the quoted advances in list prices: "Noglare" semaphore lens or glass at an advance of \$3.30. Blue, green or ruby semaphore lens or glass, prices on application.

Above list prices do not include incandescent lamps.

Information regarding alternative adjustment of headlights, on page 8. Dimensions and drilling template, page 50. Wiring diagram, page 48. Assembled and detail parts, page 56.

Imperial Incandescent Headlight for City Service

Type Z—Flush Mounting

Takes 23 to 56-Watt Regular Filament or 23 to 94-Watt Focus Type Mazda Lamp

Type Z headlight is for flush mounting on dash. An 11-inch hole is necessary for mounting this headlight, the body of which is inserted in the hole and fastened in position by six bolts.

The headlight is compact and neat in design. Both case and door frame are of cast iron finished in weather-proof black enamel. The door is hinged at the top so as to close by gravity and is held shut by a spring catch at the bottom.

A reinforcing ring, illustrated and described on page 19, is recommended for use with this headlight and is necessary where the dash is made of wood.

Type Z headlight will fit any standard car dash whose radius of curvature is 5 to 7 feet.



With Clear Glass in Plain Door
Front View



Side View



With Grid Door



With Clear Semaphore Lens in Regular Door
Front View



Side View



With Semaphore Lens and Guard Door

Alternative Adjustment

The standard adjustment for this headlight is for a 23 to 56-watt regular filament Mazda lamp. If specified on order, the headlight will be equipped with a receptacle adjusted for 23 to 94-watt focus type Mazda lamp.

Imperial Incandescent Headlight for City Service

Type Z—Flush Mounting

Takes 23 to 56-Watt Regular Filament or 23 to 94-Watt Focus Type Mazda Lamp

With Clear Glass in Plain Door

Cast-Iron Case

Diameter Reflector	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
9 ³ / ₄ Inches	Headlight with Polished Aluminum Reflector	24110	30 lbs.	\$6.40
	Headlight with White Enameled Steel Reflector	24151	30 lbs.	6.40
	Headlight with Nickel-plated Copper Reflector	28533	30 lbs.	7.00

With Clear Glass in Grid Door

Cast-Iron Case

Diameter Reflector	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
9 ³ / ₄ Inches	Headlight with Polished Aluminum Reflector	24112	30 lbs.	\$6.80
	Headlight with White Enameled Steel Reflector	24153	30 lbs.	6.80
	Headlight with Nickel-plated Copper Reflector	28645	30 lbs.	7.40

With Clear Semaphore Lens in Regular Door

Cast-Iron Case

Diameter Lens	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
8 ³ / ₈ Inches	Headlight with Polished Aluminum Reflector	24114	33 lbs.	\$8.45
	Headlight with White Enameled Steel Reflector	24155	33 lbs.	8.45
	Headlight with Nickel-plated Copper Reflector	28534	33 lbs.	9.05

With Clear Semaphore Lens in Guard Door

Cast-Iron Case

Diameter Lens	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
8 ³ / ₈ Inches	Headlight with Polished Aluminum Reflector	24118	33 lbs.	\$8.95
	Headlight with White Enameled Steel Reflector	24159	33 lbs.	8.95
	Headlight with Nickel-plated Copper Reflector	28646	33 lbs.	9.45

Net weight—With clear glass in door, 20 pounds; with semaphore lens in door, 23 pounds. Shipping dimensions: 17 x 15 x 10 inches.

If specified on the order, any of the following colored glasses or lenses will be furnished with above headlights at the quoted advances in list prices: "Noglare" semaphore lens or glass at an advance of \$3.30. Blue, green or ruby semaphore lens or glass, prices on application.

Above list prices do not include incandescent lamps.

Information regarding alternative adjustment of headlights, page 10. Dimensions and drilling template, page 50. Wiring diagram, page 48. Assembled and detailed parts, pages 56 and 57.

Imperial Incandescent Headlight for City Service

Type ZB—Flush Mounting

Takes 23 to 56-Watt Regular Filament or 23 to 94-Watt Focus Type Mazda Lamp

Type ZB headlight is arranged for flush mounting. It is made in three parts—body, clamping ring and door, all cast iron. When mounted, the body of the headlight is placed against the rear of the dash, and the clamping ring and door on the front. Body and clamping ring are fastened in place by eight bolts which pass through the ring, dash and flange on the headlight body.

This construction meets the demand for a headlight that can be mounted on a dash previously cut for a headlight of other manufacture, where the hole is not more than ten inches in diameter. No reinforcing ring is needed to mount a type ZB headlight on a wooden dash.

Type ZB headlight will fit any standard car dash whose radius of curvature is 5 to 7 feet.



With Clear Glass in Plain Door
Front View



Side View



With Grid Door



With Clear Semaphore Lens in Regular Door
Front View



Side View



With Semaphore Lens and Guard Door

Alternative Adjustment

The standard adjustment for this headlight is for a 23 to 56-watt regular filament Mazda lamp. If specified on order, the headlight will be equipped with a receptacle adjusted for 23 to 94-watt focus type Mazda lamp.

Imperial Incandescent Headlight for City Service

Type ZB—Flush Mounting

Takes 23 to 56-Watt Regular Filament or 23 to 94-Watt Focus Type Mazda Lamp

With Clear Glass in Plain Door

Cast-Iron Case

Diameter Reflector	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
9³/₄ Inches	Headlight with polished Aluminum Reflector	24801	30 lbs.	\$6.75
	Headlight with White Enameled Steel Reflector	24851	30 lbs.	6.75
	Headlight with Nickel-plated Copper Reflector	28535	30 lbs.	7.35

With Clear Glass in Grid Door

Cast-Iron Case

Diameter Reflector	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
9³/₄ Inches	Headlight with Polished Aluminum Reflector	24803	30 lbs.	\$7.15
	Headlight with White Enameled Steel Reflector	24853	30 lbs.	7.15
	Headlight with Nickel-plated Copper Reflector	28647	30 lbs.	7.80

With Clear Semaphore Lens in Regular Door

Cast-Iron Case

Diameter Lens	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
8³/₈ Inches	Headlight with Polished Aluminum Reflector	24805	33 lbs.	\$8.85
	Headlight with White Enameled Steel Reflector	24855	33 lbs.	8.85
	Headlight with Nickel-plated Copper Reflector	28536	33 lbs.	9.45

With Clear Semaphore Lens in Guard Door

Cast-Iron Case

Diameter Lens	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
8³/₈ Inches	Headlight with Polished Aluminum Reflector	24813	33 lbs.	\$9.35
	Headlight with White Enameled Steel Reflector	24863	33 lbs.	9.35
	Headlight with Nickel-plated Copper Reflector	28648	33 lbs.	9.95

Net weight—With clear glass in door, 20 pounds; with semaphore lens in door, 23 pounds. Shipping dimensions: 16 x 14 x 11 inches.

If specified on the order, any of the following colored glasses or lenses will be furnished with above headlights at the quoted advances in list prices: "Noglare" semaphore lens or glass at an advance of \$3.30. Blue, green or ruby semaphore lens or glass, prices on application.

Above list prices do not include incandescent lamps.

Information regarding alternative adjustment of headlights, page 12. Dimensions and drilling template, page 50. Wiring diagram, page 48. Assembled and detail parts, pages 57 and 58.

Imperial Incandescent Headlight for City Service

Type ZP—Flush Mounting—Pressed Steel

Takes 23 to 56-Watt Regular Filament or 23 to 94-Watt Focus Type Mazda Lamp

Type ZP headlight is for flush mounting on dash. It will fit a 10 $\frac{1}{4}$ -inch to 12 $\frac{1}{4}$ -inch hole in dash, and is secured in position by six bolts.

The case and the door are of pressed steel, finished in weather-proof black enamel. The door is hinged at the top so as to close by gravity and is regularly provided at the bottom with a swivel locking-bolt and cannot be opened without a special socket wrench, one of which will be furnished with each order for headlights. This arrangement makes theft of lamps difficult.

A suitable race-way for the wires is provided on the back of the headlight. A $\frac{1}{2}$ -inch conduit hub with set screw is located in the lower end of this race-way, making the headlight equally adapted to a conduit or exposed wire installation.

Type ZP headlight will fit any standard car dash whose radius of curvature is 5 to 7 feet.



With Plain Door



With Semaphore Lens

Alternative Adjustment

The standard adjustment for this headlight is for a 23 to 56-watt regular filament Mazda lamp. If specified on order, the headlight will be equipped with a receptacle adjusted for 23 to 94-watt focus type Mazda lamp.

Imperial Incandescent Headlight for City Service

Type ZP—Flush Mounting—Pressed Steel

Takes 23 to 56-Watt Regular Filament or 23 to 94-Watt Focus Type Mazda Lamp



Front View

With Clear Glass in Door—Pressed Steel Case



Side View

With Clear Glass in Plain Door—Pressed Steel Case

Diameter Reflector	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
9½ Inches	Headlight with Polished Aluminum Reflector	27300	24 lbs.	\$7.75
	Headlight with White Enameled Steel Reflector	27302	24 lbs.	7.75
	Headlight with Nickel-plated Copper Reflector	28537	24 lbs.	8.35



Front View

With Clear Semaphore Lens in Door—Pressed Steel Case



Side View

With Clear Semaphore Lens in Door—Pressed Steel Case

Diameter Lens	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
8¾ Inches	Headlight with Polished Aluminum Reflector	27304	27 lbs.	\$ 9.85
	Headlight with White Enameled Steel Reflector	27308	27 lbs.	9.85
	Headlight with Nickel-plated Copper Reflector	28538	27 lbs.	10.45

Net weight—With clear glass in door, 7¾ pounds; with semaphore lens in door, 10 pounds. Shipping dimensions, 19 x 18 x 8¾ inches.

If specified on the order, any of the following colored glasses or lenses will be furnished with above headlights at the quoted advances in list prices: "Noglare" semaphore lens or glass at an advance of \$3.30. Blue, green or ruby semaphore lens or glass, prices on application.

Above list prices do not include incandescent lamps.

Information regarding alternative adjustment of headlights, page 14. Dimensions and drilling template, page 50. Wiring diagram, page 48. Assembled and detailed parts, page 58.

Imperial Incandescent Headlight for City Service

Type ZW—Surface Mounting

Takes 23 to 56-Watt Regular Filament or 23 to 94-Watt Focus Type Mazda Lamp

Type ZW headlight is for flush mounting on dash and differs from type Z headlight only in the door-locking arrangement. In place of a single spring catch at the bottom, type ZW has three swivel locking-bolts. The door rim is provided with gasket, making the headlight moisture and dust-proof when the door is tightly closed.

This headlight will fit any standard dash whose radius of curvature is 5 to 7 feet.



With Clear Glass in Plain Door
Front View



Side View



With Grid Door



With Clear Semaphore Lens in Regular Door
Front View



Side View



With Semaphore Lens and Guard Door

Alternative Adjustment

The standard adjustment for this headlight is for a 23 to 56-watt regular filament Mazda lamp. If specified on order, the headlight will be equipped with a receptacle adjusted for 23 to 94-watt focus type Mazda lamp.

Imperial Incandescent Headlight for City Service

Type ZW—Flush Mounting

Takes 23 to 56-Watt Regular Filament or 23 to 94-Watt Focus Type Mazda Lamp

With Clear Glass in Plain Door

Cast-Iron Case

Diameter Reflector	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
8 ³ / ₄ Inches	Headlight with Polished Aluminum Reflector	28539	30 lbs.	\$8.50
	Headlight with White Enameled Steel Reflector	28540	30 lbs.	8.50
	Headlight with Nickel-plated Copper Reflector	28541	30 lbs.	9.10

With Clear Glass in Grid Door

Cast-Iron Case

Diameter Reflector	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
8 ³ / ₄ Inches	Headlight with Polished Aluminum Reflector	28649	30 lbs.	\$8.95
	Headlight with White Enameled Steel Reflector	28650	30 lbs.	8.95
	Headlight with Nickel-plated Copper Reflector	28651	30 lbs.	9.55

With Clear Semaphore Lens in Regular Door

Cast-Iron Case

Diameter Lens	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
8 ³ / ₈ Inches	Headlight with Polished Aluminum Reflector	28618	33 lbs.	\$10.50
	Headlight with White Enameled Steel Reflector	28619	33 lbs.	10.50
	Headlight with Nickel-plated Copper Reflector	28542	33 lbs.	11.10

With Clear Semaphore Lens in Guard Door

Cast-Iron Case

Diameter Lens	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
8 ³ / ₈ Inches	Headlight with Polished Aluminum Reflector	28652	33 lbs.	\$10.95
	Headlight with White Enameled Steel Reflector	28653	33 lbs.	10.95
	Headlight with Nickel-plated Copper Reflector	28654	33 lbs.	11.55

Net weight—With clear glass in door, 20 pounds; with semaphore lens in door, 23 pounds. Shipping dimensions, 17 x 15 x 10 inches.

If specified on the order, any of the following colored glasses or lenses will be furnished with above headlights at the quoted advances in list prices: "Noglare" semaphore lens or glass at an advance of \$3.30. Blue, green or ruby semaphore lens or glass, prices on application.

Above list prices do not include incandescent lamps.

Information regarding alternative adjustment of headlights, page 16. Dimensions and drilling template, page 50. Wiring diagram, page 48. Assembled and detail parts, pages 58 and 59.

Imperial Incandescent Headlights for City Service

Syracuse Changeable

For 23 to 56-Watt Regular Filament or 23 to 94-Watt Focus Type Mazda Lamp



With Front Contact



With Combined
Front and Side Contact



With Side Contact
(Old Style)

Syracuse Changeable Headlights		Front Contact		Combined Front and Side Contact		Side Contact (Old Style)	
Style of Headlight	Ship. Wt. Pounds	Cat. No.	List Price Each	Cat. No.	List Price Each	Cat. No.	List Price Each
Headlight only	15	17873	\$ 8.25	17883	\$ 9.00	17878	\$ 8.25
Receptacle only	15	17874	2.75	17884	3.70	17879	2.75
*Complete single end equipment.	20	17872	11.00	17881	12.65	17877	11.00
†Complete double end equipment	35	17871	13.75	17882	16.35	17876	13.75

*Includes one headlight and one receptacle.

†Includes one headlight and two receptacles.

The above headlights are regularly adjusted to accommodate 23 to 56-watt regular filament lamps, but, if specified on the order, they will be adjusted to accommodate any focus type lamp from 23 to 94 watts, without extra charge.

Shipping dimensions, one headlight and two receptacles: 11 x 16 x 27 inches.

Above list prices do not include incandescent lamps.

Assembled and detail parts, pages 59 and 60.

Wiring diagrams, page 49.

Dimensions, page 51.

Reinforcing Ring for Type Z Headlight



Side View
Showing Reinforcing Ring



Back View
Showing Reinforcing Ring

The above views show type Z headlight mounted on a wooden dash. In such an installation, a reinforcing ring is necessary to hold in position the ends of boards at opening in dash. By means of bolts, the ends of boards are clamped tightly between the reinforcing ring and the flange of case. This reinforcing ring is cast iron, and is drilled for fastening bolts.

Listing

Description	Catalog Number	List Price Each
Reinforcing Ring	24120	\$.60

Imperial Incandescent Headlights for City and Suburban Service

Type WDS

For Surface Mounting

Type WDF

For Flush Mounting

Lamp is Mounted Horizontally

Take 23 to 94-Watt Focus Type Mazda Lamp

Types WDS and WDF headlights have the same illuminating characteristics and are different in general construction only to the extent that the former is designed for surface mounting and the latter for flush mounting.

The lamp receptacle is mounted in a horizontal position, and an adjustable lamp receptacle bracket, operated by a pull or push, makes it possible to adjust lamps of various wattages easily and properly to the focal point of the reflector. This is a necessary feature, as there is a variation in the light center lengths of focus type Mazda lamps.

Each of the above types is listed with two styles of cases; in one the body and door frame are cast iron, and in the other they are pressed steel. Both styles of cases are designed and constructed to meet fully the requirements of the service for which they are intended.

The headlights are listed with the following reflectors: Crystal Ray reflector, Gold Ray reflector and Sterling Ray reflector, all of which are true paraboloids. The Gold Ray reflector produces a beam of light tinged with yellow, due to the partial absorption of the rays at the blue end of the spectrum. A still greater percentage of these blue and violet rays is absorbed by the "Noglare" glass, which may be used with either Crystal Ray or Sterling Ray reflector. In contrast with modern street illuminants, a headlight beam of this color is somewhat more conspicuous.

Both types of headlights are listed with clear glass in plain door, but, if specified on the order, will be furnished with grid door, which affords protection to the glass. The doors are all hinged from the top. The cast-iron door is drawn tight against the body of the case by means of a swivel locking-bolt, while for the pressed steel door the same result is gained by means of a lever catch. The cast-iron case is provided with a gasket to insure a dust and weather-proof fit between the door and the case. No gasket is necessary with the pressed steel construction.

Both types of headlights are fastened to the dash by six bolts. Type WDF with $9\frac{5}{8}$ -inch reflector, requires an 11-inch hole; for $9\frac{3}{8}$ -inch reflector any hole between 7 inches and 11 inches in diameter will be satisfactory. Type WDF headlight is interchangeable with types WBF, WCF, Z, ZW and MBF headlights.

These headlights are regularly arranged to accommodate any 23 to 94-watt, 105 to 130-volt, focus type Mazda headlight lamp.

Imperial Incandescent Headlights for City and Suburban Service

Type WDS

For Surface Mounting

Type WDF

For Flush Mounting

Lamp is Mounted Horizontally
Take 23 to 94-Watt Focus Type Mazda Lamp



Type WDS Headlight with Gold Ray Reflector
Surface—Pressed Steel—Plain Door



Type WDF Headlight
Flush—Pressed Steel—Plain Door



Type WDS Headlight
Surface—Cast Iron—Grid Door
(See Listings below)



Type WDF Headlight with Gold Ray Reflector
Flush—Cast Iron—Plain Door

Alternative Arrangements for Headlights

Prices given in this table are to be added to list prices given on pages 22 and 23	Add to List Prices
Grid door, in place of plain door. (Pressed Steel)	\$1.25
Grid door, in place of plain door. (Cast Iron)50
"Noglare" glass, in place of clear glass	3.30

List prices referred to below are given on pages 22 and 23.

If specified on the order, a portable steel headlight, type WDP, with 9 $\frac{3}{8}$ -inch or 9 $\frac{5}{8}$ -inch reflector, will be furnished, including lamp hangers, bumpers, plug and cable, at an increase of \$5.50 in list price for type WDS headlight with corresponding reflector, or same equipment with two plugs will be furnished at an increase of \$6.60 in list price.

If specified on the order, above headlights will be furnished with Sterling Ray aluminum reflector, at a decrease of \$0.50 in the list prices for headlight with standard Sterling Ray reflector, which is nickel-plated copper.

Imperial Incandescent Headlight for City and Suburban Service

Type WDS—Surface Mounting

Lamp is Mounted Horizontally Clear Glass in Plain Door

Takes 23 to 94-Watt Focus Type Mazda Lamp



Side View, 9½-Inch Reflector



With Pressed Steel Case, Front View—Plain Door



Side View, 9½-Inch Reflector

Type WDS Headlights—Pressed Steel Case—Plain Door

Reflector Dimen.	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
Dia. 9 3/8" Focus 1 3/8"	Headlight with Crystal Ray Reflector	28515	26 lbs.	\$15.85
	Headlight with Gold Ray Reflector	28516	26 lbs.	15.85
	Headlight with Sterling Ray Reflector	28517	24 lbs.	13.50
Dia. 9 5/8" Focus 1 15/16"	Headlight with Crystal Ray Reflector	28559	26 lbs.	15.85
	Headlight with Gold Ray Reflector	28560	26 lbs.	15.85
	Headlight with Sterling Ray Reflector	28561	24 lbs.	13.50



Front View

With Cast-Iron Case—Plain Door



Side View

Type WDS Headlights—Cast-Iron Case—Plain Door

Reflector Dimen.	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
Dia. 9 5/8" Focus 1 15/16"	Headlight with Crystal Ray Reflector	28201	37 lbs.	\$15.85
	Headlight with Gold Ray Reflector	28200	37 lbs.	15.85
	Headlight with Sterling Ray Reflector	28562	35 lbs.	13.50

Net weight—Fifteen pounds less than shipping weight; shipping dimensions, 16¼ x 16¼ x 11½ inches.

Above list prices do not include incandescent lamps.

Information regarding alternative arrangements of headlights, page 21. Dimensions and drilling template, see pages 52 and 53. Main and dimming resistances, page 45. Wiring diagram, page 48. Assembled and detailed parts, pages 60, 61, 62 and 63.

Imperial Incandescent Headlight for City and Suburban Service

Type WDF—Flush Mounting

Lamp is Mounted Horizontally Clear Glass in Plain Door
Takes 23 to 94-Watt Focus Type Mazda Lamp



Side View, 9 $\frac{3}{8}$ -Inch Reflector



With Pressed Steel Case, Front View—Plain Door



Side View, 9 $\frac{5}{8}$ -Inch Reflector

Type WDF Headlights—Pressed Steel Case—Plain Door

Reflector Dimen.	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
Dia. 9 $\frac{3}{8}$ " Focus 1 $\frac{3}{8}$ "	Headlight with Crystal Ray Reflector	28518	26 lbs.	\$15.85
	Headlight with Gold Ray Reflector	28519	26 lbs.	15.85
	Headlight with Sterling Ray Reflector	28520	24 lbs.	13.50
Dia. 9 $\frac{5}{8}$ " Focus 1 $\frac{15}{16}$ "	Headlight with Crystal Ray Reflector	28563	26 lbs.	15.85
	Headlight with Gold Ray Reflector	28564	26 lbs.	15.85
	Headlight with Sterling Ray Reflector	28565	24 lbs.	13.50



Front View—Plain Door



Side View—Plain Door

With Cast-Iron Case—Plain Door

Type WDF Headlights—Cast-Iron Case—Plain Door

Reflector Dimen.	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
Dia. 9 $\frac{5}{8}$ " Focus 1 $\frac{15}{16}$ "	Headlight with Crystal Ray Reflector	28231	37 lbs.	\$15.85
	Headlight with Gold Ray Reflector	28230	37 lbs.	15.85
	Headlight with Sterling Ray Reflector	28566	35 lbs.	13.50

Net weight—Fifteen pounds less than shipping weight; shipping dimensions, 16 $\frac{1}{4}$ x 16 $\frac{1}{4}$ x 11 $\frac{1}{2}$ inches.

Above list prices do not include incandescent lamps.
Information regarding alternative arrangements of headlights, page 21. Dimensions and drilling template, pages 52 and 53. Main and dimming resistances, page 45. Wiring diagram, page 48. Assembled and detailed parts, pages 60, 61, 62 and 63.

Imperial Incandescent Headlights for City and Suburban Service

Type WBS

For Surface Mounting

Type WBF

For Flush Mounting

Lamp is Mounted 30 Degrees from the Vertical

Take 23 to 94-Watt Focus Type Mazda Lamp

Types WBS and WBF headlights have the same illuminating characteristics and are different in general construction only to the extent that the former is designed for surface mounting and the latter for flush mounting.

The lamp receptacle is mounted with its axis 30 degrees from the vertical, and an adjustable lamp receptacle bracket, operated by a knurled wheel, makes it possible to adjust lamps of various wattages easily and properly to the focal point of the reflector. This is a necessary feature, as there is a variation in the light center lengths of focus type Mazda lamps.

Each of the above types is listed with two styles of cases; in one the body and door frame are cast iron, and in the other they are pressed steel. Both styles of cases are designed and constructed to meet fully the requirements of the service for which they are intended.

The headlights are listed with the following reflectors: Crystal Ray reflector, Gold Ray reflector and Sterling Ray reflector, all of which are true paraboloids. The Gold Ray reflector produces a beam of light tinged with yellow, due to the partial absorption of the rays at the blue end of the spectrum. A still greater percentage of these blue and violet rays is absorbed by the "Noglare" glass, which may be used with either Crystal Ray or Sterling Ray reflector. In contrast with modern street illuminants, a headlight beam of this color is somewhat more conspicuous.

Both types of headlights are listed with clear glass in plain door, but, if specified, on the order, will be furnished with grid door, which affords protection to the glass. The doors are all hinged from the top. The cast-iron door is drawn tight against the body of the case by means of a swivel locking-bolt, while for the pressed steel door the same result is gained by means of a lever catch.

The cast-iron case is provided with a gasket to insure a dust and weather-proof fit between the door and the case. No gasket is necessary with the pressed steel construction.

Both types of headlights are fastened to the dash by six bolts. Type WBF requires an 11-inch hole in dash, and is interchangeable with types WDF, WCF, MBF, Z and ZW headlights.

These headlights are regularly arranged to accommodate any 23 to 94-watt, 105 to 130-volt focus type Mazda headlight lamp.

Imperial Incandescent Headlights for City and Suburban Service

Type WBS

For Surface Mounting

Type WBF

For Flush Mounting

Lamp is Mounted 30 Degrees from the Vertical

Take 23 to 94-Watt Focus Type Mazda Lamp



Type WBS Headlight with Gold Ray Reflector
Surface—Pressed Steel—Plain Door



Type WBF Headlight
Flush—Pressed Steel—Plain Door



Type WBS Headlight
Surface—Cast Iron—Plain Door



Type WBF Headlight with Gold Ray Reflector
Flush—Cast Iron—Grid Door
(See Listings, below)

Alternative Arrangements for Headlights

Prices given in this table are to be added to list prices given on pages 26 and 27	Add to List Prices
Grid door, in place of plain door. (Pressed Steel)	\$1.25
Grid door, in place of plain door. (Cast Iron)	.50
"Noglare" glass in place of clear glass	3.30

List prices referred to below are given on pages 26 and 27.

If specified on the order, a portable steel headlight, type WBP, with 9⁵/₈-inch reflector, will be furnished, including lamp hangers, bumpers, plug and cable, at an increase of \$5.50 in the list price for type WBS headlight with corresponding reflector, or same equipment with two plugs will be furnished, at an increase of \$6.60 in list price.

If specified on the order, above headlights will be furnished with Sterling Ray aluminum reflectors, at a decrease of \$0.50 in the list prices for headlight with standard Sterling Ray reflector, which is nickel-plated copper.

Imperial Incandescent Headlight for City and Suburban Service

Type WBS—Surface Mounting

Lamp is Mounted 30 Degrees from the Vertical Clear Glass in Plain Door

Takes 23 to 94-Watt Focus Type Mazda Lamp



Front View



Side View

With Pressed Steel Case—Plain Door

Type WBS Headlights—Pressed Steel Case—Plain Door

Reflector Dimen.	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
Dia. 9 $\frac{3}{8}$ " Focus 1 $\frac{1}{16}$ "	Headlight with Crystal Ray Reflector . . .	28543	26 lbs.	\$15.85
	Headlight with Gold Ray Reflector . . .	28544	26 lbs.	15.85
	Headlight with Sterling Ray Reflector . . .	28545	24 lbs.	13.50



Front View



Side View

With Cast-Iron Case—Plain Door

Type WBS Headlights—Cast-Iron Case—Plain Door

Reflector Dimen.	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
Dia. 9 $\frac{3}{8}$ " Focus 1 $\frac{1}{16}$ "	Headlight with Crystal Ray Reflector . . .	28261	37 lbs.	\$15.85
	Headlight with Gold Ray Reflector . . .	28260	37 lbs.	15.85
	Headlight with Sterling Ray Reflector . . .	28546	35 lbs.	13.50

Net weight—Fifteen pounds less than shipping weight; shipping dimensions, 16 $\frac{1}{2}$ x 16 $\frac{1}{2}$ x 10 inches.

Above list prices do not include incandescent lamps.

Information regarding alternative arrangements of headlights, page 25. Dimensions and drilling template, pages 52 and 53. Main and dimming resistances, page 45. Wiring diagram, page 48. Assembled and detailed parts, pages 60, 61, 62 and 63.

Imperial Incandescent Headlight for City and Suburban Service

Type WBF—Flush Mounting

Lamp is Mounted 30 Degrees from the Vertical Clear Glass in Plain Door

Takes 23 to 94-Watt Focus Type Mazda Lamp



Front View

With Pressed Steel Case—Plain Door



Side View

Type WBF Headlights—Pressed Steel Case—Plain Door

Reflector Dimen.	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
Dia. $9\frac{5}{8}$ "	Headlight with Crystal Ray Reflector. . .	28547	26 lbs.	\$15.85
Focus $1\frac{13}{16}$ "	Headlight with Gold Ray Reflector. . .	28548	26 lbs.	15.85
	Headlight with Sterling Ray Reflector. . .	28549	24 lbs.	13.50



Front View

With Cast-Iron Case—Plain Door



Side View

Type WBF Headlights—Cast-Iron Case—Plain Door

Reflector Dimen.	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
Dia. $9\frac{5}{8}$ "	Headlight with Crystal Ray Reflector. . .	28291	37 lbs.	\$15.85
Focus $1\frac{13}{16}$ "	Headlight with Gold Ray Reflector. . .	28290	37 lbs.	15.85
	Headlight with Sterling Ray Reflector. . .	28550	35 lbs.	13.50

Net weight—Fifteen pounds less than shipping weight; shipping dimensions, $16\frac{1}{2} \times 16\frac{1}{2} \times 10\frac{1}{8}$ inches.

Above prices do not include incandescent lamps.

Information regarding alternative arrangements of headlights page 25. Dimensions and drilling template, pages 52 and 53. Main and dimming resistances, page 45. Wiring diagram, page 48. Assembled and detailed parts, pages 60, 61, 62 and 63.

Imperial Incandescent Headlights for City and Suburban Service

Type WCS

For Surface Mounting

Type WCF

For Flush Mounting

Lamp is Mounted Vertically

Take 23 to 94-Watt Focus Type Mazda Lamp

Types WCS and WCF headlights have the same illuminating characteristics and are different in general construction only to the extent that the former is designed for surface mounting and the latter for flush mounting.

The lamp receptacle is mounted in a vertical position, and an adjustable lamp receptacle bracket, operated by a push or a pull and locked by a set screw, makes it possible to adjust lamps of various wattages easily and properly to the focal point of the reflector. This is a necessary feature, as there is a variation in the light center lengths of focus type Mazda lamps.

Each of the above types is listed with two styles of cases; in one, the body and door frame are cast iron, and in the other they are pressed steel. Both styles of cases are designed and constructed to meet fully the requirements of the service for which they are intended.

The headlights are listed with the following reflectors: Crystal Ray reflector, Gold Ray reflector and Sterling Ray reflector, all of which are true paraboloids. The Gold Ray reflector produces a beam of light tinged with yellow, due to the partial absorption of the rays at the blue end of the spectrum. A still greater percentage of these blue and violet rays is absorbed by the "Noglare" glass, which may be used with either Crystal Ray or Sterling Ray reflector. In contrast with modern street illuminants, a headlight beam of this color is somewhat more conspicuous.

Both types of headlights are listed with clear glass in plain door, but, if specified, on the order, will be furnished with grid door, which affords protection to the glass. The doors are all hinged from the top. The cast-iron door is drawn tight against the body of the case by means of a swivel locking-bolt, while for the pressed steel door the same result is gained by means of a lever catch.

The cast-iron case is provided with a gasket to insure a dust and weather-proof fit between the door and the case. No gasket is necessary with the pressed steel construction.

Both types of headlights are fastened to the dash by six bolts. Type WCF requires an 11-inch hole in dash, and is interchangeable with types WDF, WBF, MBF, Z and ZW headlights.

These headlights are regularly arranged to accommodate any 23 to 94-watt, 105 to 130-volt focus type Mazda headlight lamp.

Imperial Incandescent Headlights for City and Suburban Service

Type WCS

For Surface Mounting

Type WCF

For Flush Mounting

Lamp is Mounted Vertically

Take 23 to 94-Watt Focus Type Mazda Lamp



Type WCS with Gold Ray Reflector
Surface—Pressed Steel—Plain Door



Type WCF
Flush—Pressed Steel—Plain Door



Type WCS
Surface—Cast Iron—Grid Door
(See Listings, below)



Type WCF with Gold Ray Reflector
Flush—Cast Iron—Plain Door

Alternative Arrangements for Headlights

Prices given in this table are to be added to list prices given on pages 30 and 31	Add to List Prices
Grid door, in place of plain door. (Pressed Steel)	\$1.25
Grid door, in place of plain door. (Cast Iron)50
"Noglare" glass, in place of clear glass	3.30

List prices referred to below are given on pages 30 and 31.

If specified on the order, a portable headlight, type WCP, with 9 $\frac{5}{8}$ -inch reflector, will be furnished including lamp hangers, bumpers, plug and cable, at an increase of \$5.50 in list price for type WCS headlight with corresponding reflector, or same equipment with two plugs will be furnished, at an increase of \$6.60 in list price.

If specified on the order, above headlights will be furnished with Sterling Ray aluminum reflectors, at a decrease of \$0.50 in the list prices for headlight with standard Sterling Ray reflector, which is nickel-plated copper.

Imperial Incandescent Headlight for City and Suburban Service

Type WCS—Surface Mounting

Lamp is Mounted Vertically

Clear Glass in Plain Door

Takes 23 to 94-Watt Focus Type Mazda Lamp



Front View



Side View

With Pressed Steel Case—Plain Door

Type WCS Headlights—Pressed Steel Case—Plain Door

Reflector Dimen.	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
Dia. $9\frac{5}{8}$ " Focus $1\frac{15}{16}$ "	Headlight with Crystal Ray Reflector . . .	28551	26 lbs.	\$15.85
	Headlight with Gold Ray Reflector . . .	28552	26 lbs.	15.85
	Headlight with Sterling Ray Reflector. . .	28553	24 lbs.	13.50



Front View



Side View

With Cast-Iron Case—Plain Door

Type WCS Headlights—Cast-Iron Case—Plain Door

Reflector Dimen.	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
Dia. $9\frac{5}{8}$ " Focus $1\frac{15}{16}$ "	Headlight with Crystal Ray Reflector . . .	28321	36 lbs.	\$15.85
	Headlight with Gold Ray Reflector . . .	28320	36 lbs.	15.85
	Headlight with Sterling Ray Reflector. . .	28554	34 lbs.	13.50

Net weight—Fifteen pounds less than shipping weight; shipping dimensions, $16\frac{1}{4} \times 16\frac{1}{4} \times 9\frac{1}{2}$ inches.

Above list prices do not include incandescent lamps.

Information regarding alternative arrangements of headlights, page 29. Main and dimming resistances, page 45. Dimensions and drilling template, pages 52 and 53. Wiring diagram, page 48. Assembled and detailed parts, pages 60, 61, 62 and 63.

Imperial Incandescent Headlight for City and Suburban Service

Type WCF—Flush Mounting

Lamp is Mounted Vertically

Clear Glass in Plain Door

Takes 23 to 94-Watt Focus Type Mazda Lamp



Front View

With Pressed Steel Case—Plain Door



Side View

Type WCF Headlights—Pressed Steel Case—Plain Door

Reflector Dimen.	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
Dia. $9\frac{5}{8}$ " Focus $1\frac{15}{16}$ "	Headlight with Crystal Ray Reflector . . .	28555	26 lbs.	\$15.85
	Headlight with Gold Ray Reflector . . .	28556	26 lbs.	15.85
	Headlight with Sterling Ray Reflector . . .	28557	24 lbs.	13.50



Front View

With Cast-Iron Case—Plain Door



Side View

Type WCF Headlights—Cast-Iron Case—Plain Door

Reflector Dimen.	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
Dia. $9\frac{5}{8}$ " Focus $1\frac{15}{16}$ "	Headlight with Crystal Ray Reflector . . .	28340	36 lbs.	\$15.85
	Headlight with Gold Ray Reflector . . .	28341	36 lbs.	15.85
	Headlight with Sterling Ray Reflector . . .	28558	34 lbs.	13.50

Net weight—Fifteen pounds less than shipping weight; shipping dimensions, $16\frac{1}{4} \times 16\frac{1}{4} \times 9\frac{1}{2}$ inches.

Above list prices do not include incandescent lamps.

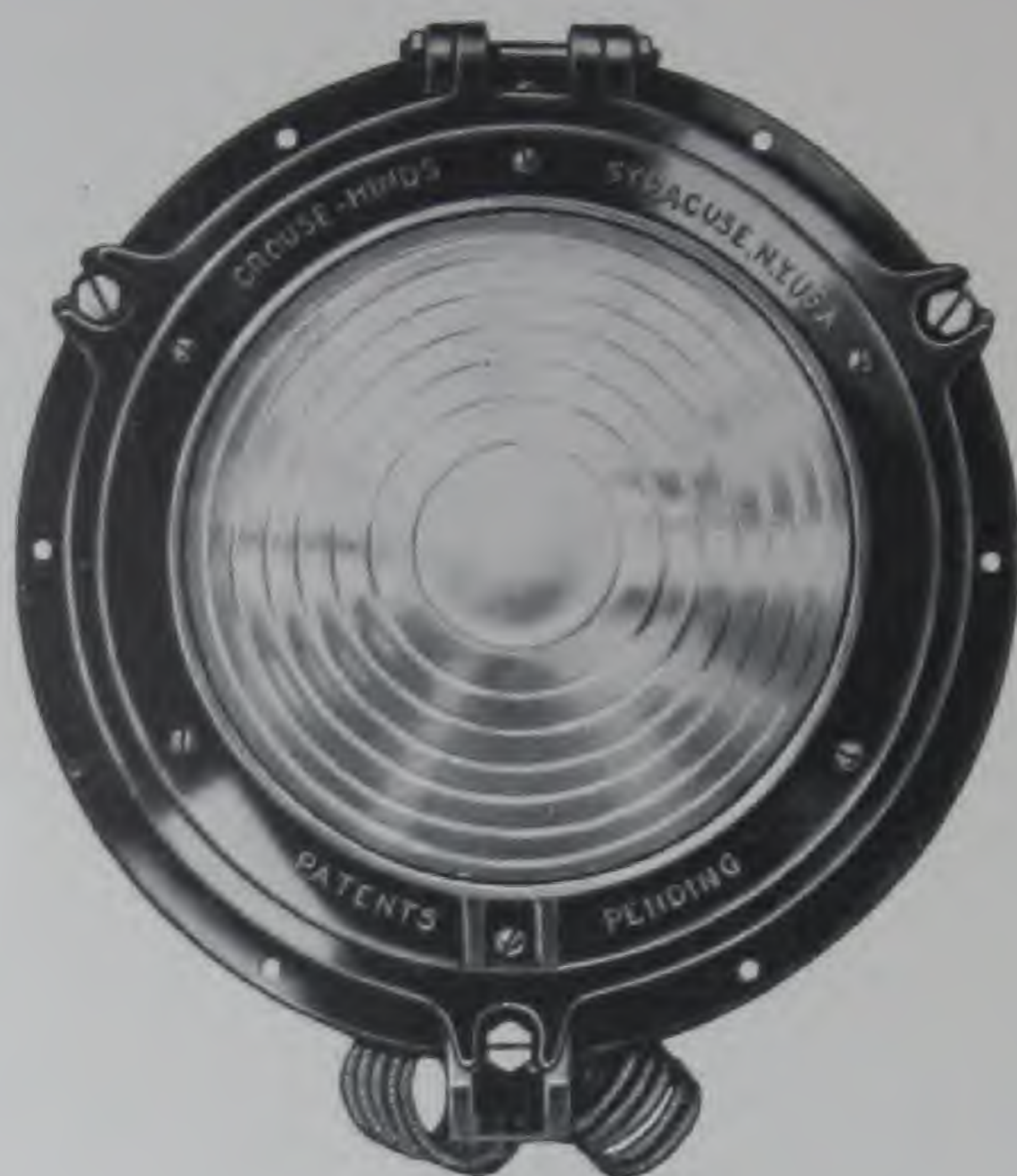
Information regarding alternative arrangements of headlights, page 29. Main and dimming resistances, page 45. Dimensions and drilling template, pages 52 and 53. Wiring diagram, page 48. Assembled and detailed parts, pages 60, 61, 62 and 63.

Imperial Incandescent Headlights for City and Suburban Service

Type MBS—Surface Mounting Type MBF—Flush Mounting

Lamp is Mounted Vertically Semaphore Lens in Guard Door

Take 23 to 94-Watt Focus Type Mazda Lamp



Front View



Sectional View

Types MBS and MBF headlights are high candle power incandescent headlights, and have the same illuminating characteristics. They are different in general construction only to the extent that the former is designed for surface mounting and the latter for flush mounting.

The principle of this headlight involves the combination of mirror reflector, doublet lens and semaphore lens. The doublet lens, interposed between the light source and the main semaphore lens, has the effect of shortening the focal length of the main lens, thus utilizing a greater percentage of the light flux, but without increasing the beam's angle of divergence. The source of light is located at the focal point of the mirror reflector. This combination utilizes the maximum amount of light emitted by the light source, and, with a focus type lamp in use, projects a powerful, concentrated beam of light which brilliantly illuminates the track.

The lamp receptacle is mounted in a vertical position, and an adjustable lamp receptacle bracket makes it possible to adjust lamps of various wattages easily and properly to the focal point of the reflector. This is a necessary feature, as there is a variation in the light center lengths of focus type Mazda lamps.

The headlight is provided with a substantial cast-iron case, well suited to withstand the service for which it is intended and is impervious to the action of the elements. An 8 $\frac{3}{8}$ -inch clear semaphore lens is mounted in the door and securely held in place by a projecting collar, which also protects it from breakage.

Inside of and secured to the inner surface of the door is a clamping device which supports the doublet lens.

To meet the requirements of railways which desire headlights with yellow beams, types MBS and MBF headlights may be equipped with a "Noglare" doublet lens. This lens produces a beam of light tinged with yellow, due to absorption of the rays at the blue end of the spectrum. In contrast with modern street illuminants, a headlight beam of this color is somewhat more conspicuous.

Imperial Incandescent Headlights for City and Suburban Service

Type MBS—Surface Mounting Type MBF—Flush Mounting

Lamp is Mounted Vertically Semaphore Lens in Guard Door

Take 23 to 94-Watt Focus Type Mazda Lamp



Type MBS Headlight
Side View



Types MBS and MBF Headlights
Front View



Type MBF Headlight
Side View

Type MBS Headlights—Surface Mounting—Cast-Iron Case

Diameter Lens	Equipment	Catalog Number	Shipping Weight	List Price Each
8³/₈ Inches	Headlight with Clear Doublet Lens . . .	28100	45 lbs.	\$15.00
	Headlight with "Noglare" Doublet Lens	28101	45 lbs.	16.85

Type MBF Headlights—Flush Mounting—Cast-Iron Case

Diameter Lens	Equipment	Catalog Number	Shipping Weight	List Price Each
8³/₈ Inches	Headlight with Clear Doublet Lens . . .	28102	48 lbs.	\$15.00
	Headlight with "Noglare" Doublet Lens	28103	48 lbs.	16.85

Net weights—Type MBS, 28 pounds; type MBF, 31 pounds; shipping dimensions, 16¹/₄x16¹/₄x11 inches.

Diameter of doublet lens, 6⁵/₈ inches. Diameter of reflector, 4¹¹/₁₆ inches.

Above list prices do not include incandescent lamps.

Dimensions and drilling template, page 51. Main and dimming resistances, page 45. Wiring diagram, page 48. Assembled and detail parts, page 63.

Imperial Incandescent Headlights for Interurban Service
Type SDP (12 and 16-Inch)
Type SDS (12-Inch)

Portable
Pressed Steel
Stationary

Lamp is Mounted Horizontally

Twelve-Inch Sizes Take 23 to 250-Watt, and 16-Inch Size Takes 23 to 500-Watt
Focus Type Mazda Lamp

Types SDP (portable) and SDS (stationary) headlights have pressed steel cases and are different only as their respective mounting requirements necessitate.

The lamp receptacle is mounted in a horizontal position and an adjustable lamp receptacle bracket, operated by a knurled wheel, on the back of the case for the portable headlights and by a push and pull for stationary headlights makes it possible to adjust the lamp filament easily and properly to the focal point of the reflector. This is a necessary feature, as there is a variation in the light center lengths of the various incandescent lamps used in these headlights.

Type SD headlights are listed with the following reflectors: Crystal Ray reflector, Gold Ray reflector and Sterling Ray reflector, all of which are true paraboloids. The Gold Ray reflector produces a beam of light tinged with yellow, due to the partial absorption of the rays at the blue end of the spectrum. A still greater percentage of these blue and violet rays is absorbed by the "Noglare" glass, which may be used with either Crystal Ray or Sterling Ray reflector. In contrast with modern street illuminants, a headlight beam of this color is somewhat more conspicuous.

Both forms of the headlight are listed with clear glass in plain door, but a grid door will be furnished, if ordered. These grid doors afford protection to the glass. The door is hinged at the top and is drawn tight against the case by means of a lever catch. The case is dust and weather-proof.

The portable headlight is equipped with hanger hooks, bumper studs, feet and handle, and is designed to be mounted on a dash hanger, screwed to the dash. By means of the bumper studs, the beam of light can be levelled on the track. The stationary headlight is intended to be bolted permanently to the car dash by means of eight bolts. If desired, the supporting flange may be located anywhere on the casing, so that the headlight can be recessed in the dash.

Type SD headlight with 12-inch reflector is arranged to accommodate any focus type Mazda lamp of 250 watts or less, in a G-30 bulb or smaller.

Type SD portable headlight with a 16-inch reflector is designed for use on very high speed interurban roads. This headlight is made with Sterling Ray reflector only. This 16-inch headlight will accommodate any incandescent lamp of 500 watts or less in a G-40 bulb or smaller, and the resultant illumination with these high wattage focus type lamps affords ample protection to the fastest trains.

Alternative Arrangements for Headlights

Prices given in this table are to be added to list prices given on page 35	Add to List Prices
Grid door, in place of plain door. (12-inch headlights)	\$1.25
Grid door, in place of plain door. (16-inch headlights)	1.80
"Noglare" glass, in place of clear glass. (12-inch headlights)	5.10

List prices referred to below are given on page 35.

If specified on the order, above headlights will be furnished with Sterling Ray aluminum reflectors, at the following decreases in list prices for headlights with standard Sterling Ray reflectors, which are nickel-plated copper: 16-inch, \$1.00; 12-inch, \$.75.

Imperial Incandescent Headlights for Interurban Service

Type SDP, (12 and 16-Inch)
 Portable

Type SDS, (12-Inch)
 Pressed Steel
 Stationary

Lamp is Mounted Horizontally

Twelve-Inch Size Takes 23 to 250-Watt, and Sixteen-Inch Size Takes 23 to 500-Watt Focus Type Mazda Lamp



Type SDP—Portable



Type SDS—Stationary

Types SDP and SDS Headlights—With 12-Inch Reflector

Take 23 to 250-Watt Focus Type Mazda Lamps

*Type SDP—Portable

Reflector Dimensions	Style of Reflector	Catalog Number	Shipping Weight	*List Price
Dia. 12" Focus 2 1/8"	Headlight with Crystal Ray Reflector . . .	28579	53 lbs.	\$33.50
	Headlight with Gold Ray Reflector . . .	28580	53 lbs.	33.50
	Headlight with Sterling Ray Reflector . .	28581	50 lbs.	29.00

Type SDS—Stationary

Dia. 12" Focus 2 1/8"	Headlight with Crystal Ray Reflector . . .	28583	50 lbs.	\$25.95
	Headlight with Gold Ray Reflector . . .	28584	50 lbs.	25.95
	Headlight with Sterling Ray Reflector . .	28585	47 lbs.	21.45

*Type SDP Headlight—Portable, with 16-Inch Reflector

Takes 23 to 500-Watt Focus Type Mazda Lamp

Dia. 16" Focus 2 3/4"	Headlight with Sterling Ray Reflector . .	28582	62 lbs.	\$40.00
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*For headlight arranged for grounded circuit (one plug), deduct \$1.15 from list price.

Net weights—Twelve-inch headlights, 25 pounds less than shipping weights; sixteen-inch headlights, 35 pounds less than shipping weights.

Shipping dimensions—Twelve-inch headlights, 19 x 18 x 13 inches; sixteen-inch headlights, 25 x 23 x 17 inches.

Following are given parts necessary for complete single and double end equipments: **Single End Equipment**—One headlight, one resistance, one fuse block, one fuse, one switch, one dash hanger, and two single pole receptacles. **Double End Equipment**—One headlight, one resistance, one fuse block, one fuse, two dash hangers, two switches and four single pole receptacles.

Above list prices do not include incandescent lamps.

Above resistances, page 45. Fuse, fuse block and dash hanger, page 45. Switches, page 47. Plugs, receptacles and boxes, page 44.

Information regarding alternative arrangements of headlights, page 34. Dimensions and drilling template, page 54. Wiring diagram, page 48. Assembled and detailed parts, pages 63, 64 and 65.

Imperial Incandescent Headlights for Interurban Service

Type SAP—Portable

Pressed Steel

Type SAS—Stationary

Lamp is Mounted 30 Degrees from Vertical
Take 23 to 250-Watt Focus Type Mazda Lamp

Type SAP headlight (portable) and type SAS headlight (stationary) are of pressed steel construction. Both types have the same illuminating characteristics and are different in their general construction only as the styles of mounting necessitate.

The lamp receptacle is mounted 30 degrees from the vertical and an adjustable lamp receptacle bracket, operated by a knurled wheel, makes it possible to adjust the lamp filament easily and properly to the focal point of the reflector. This is a necessary feature, as there is a variation in the light center lengths of the various incandescent lamps used in these headlights.

The headlights are listed with the following reflectors: Crystal Ray reflector, Gold Ray reflector and Sterling Ray reflector, all of which are true paraboloids. The Gold Ray reflector produces a beam of light tinged with yellow, due to the partial absorption of the rays at the blue end of the spectrum. A still greater percentage of these blue and violet rays is absorbed by the "Noglare" glass, which may be used with either Crystal Ray or Sterling Ray reflector. In contrast with modern street illuminants, a headlight beam of this color is somewhat more conspicuous.

Both types of headlights are listed with clear glass in plain door, but a grid door will be furnished, if ordered. These grid doors afford protection to the glass. The door is hinged at the top and is drawn tight against the case by means of a lever catch. The case is dust and weather-proof.

The portable headlight is equipped with hanger hooks, bumper studs, feet and handle, and is designed to be mounted on a dash hanger, screwed to the dash. By means of the bumper studs, the beam of light can be levelled on the track. The stationary headlight is intended to be bolted permanently to the car dash by means of eight bolts. If desired, the supporting flange may be located anywhere on the casing, so that the headlight can be recessed in the dash.

These headlights are regularly arranged to accommodate any focus type Mazda lamp of 250 watts or less, in a G-30 bulb or smaller.

Alternative Arrangements for Headlights

Prices given in this table are to be added to list prices given on page 37		Add to List Prices
Grid door, in place of plain door.		\$1.25
"Noglare" glass, in place of clear glass		5.10

List prices referred to below are given on page 37.

If specified on the order, above headlights will be furnished with Sterling Ray aluminum reflectors, at a decrease of \$.75 in the list prices for headlights with standard Sterling Ray reflectors, which are nickel-plated copper.

Imperial Incandescent Headlights for Interurban Service

Type SAP—Portable

Type SAS—Stationary

Pressed Steel

Lamp is Mounted 30 Degrees from Vertical

Take 23 to 250-Watt Focus Type Mazda Lamp



Type SAP—Portable



Type SAS—Stationary

*Type SAP Headlights—Portable

Reflector Dimen.	Style of Reflector	Catalog Number	Shipping Weight	*List Price
Dia. 12" Focus 2 ¹⁷ / ₃₂ "	Headlight with Crystal Ray Reflector . .	28573	53 lbs.	\$33.50
	Headlight with Gold Ray Reflector . . .	28574	53 lbs.	33.50
	Headlight with Sterling Ray Reflector . .	28575	50 lbs.	29.00

Type SAS Headlights—Stationary

Dia. 12" Focus 2 ¹⁷ / ₃₂ "	Headlight with Crystal Ray Reflector . .	28576	50 lbs.	\$25.95
	Headlight with Gold Ray Reflector . . .	28577	50 lbs.	25.95
	Headlight with Sterling Ray Reflector . .	28578	47 lbs.	21.45

*For headlight arranged for grounded circuit (one plug), deduct \$1.15 from list price.

Net weights—Twenty-five pounds less than shipping weights; shipping dimensions, 19x18x12 inches.

Following are the parts necessary for the complete equipments: **Single End Equipments**—One headlight, one resistance, one fuse block, one fuse, one switch, one dash hanger, and two single pole receptacles. **Double End Equipment**—One headlight, one resistance, one fuse block, one fuse, two dash hangers, two switches and four single pole receptacles.

Above list prices do not include incandescent lamps.

Above resistances, page 45. Fuse, fuse block and dash hanger, page 45. Switches, page 47. Plugs, receptacles and boxes, page 44.

Information regarding alternative arrangements of headlights, page 36. Dimensions and drilling template, page 54. Wiring diagram, page 48. Assembled and detailed parts, pages 63, 64 and 65.

Imperial Incandescent Headlights for Interurban Service
Type SCP—Portable
Type SCS—Surface Mounting

Pressed Steel
Lamp is Mounted Vertically

Take 23 to 250-Watt Focus Type Mazda Lamp

Type SCP headlight (portable) and type SCS headlight (stationary) are of pressed steel construction. Both types have the same illuminating characteristics and are different in their general construction only as the styles of mounting necessitate.

The lamp receptacle is mounted in a vertical position and an adjustable lamp receptacle bracket makes it possible to adjust the lamp filament easily and properly to the focal point of the reflector. This is a necessary feature, as there is a variation in the light center lengths of the various incandescent lamps used in these headlights.

The headlights are listed with the following reflectors: Crystal Ray reflector, Gold Ray reflector and Sterling Ray reflector, all of which are true paraboloids. The Gold Ray reflector produces a beam of light tinged with yellow, due to the partial absorption of the rays at the blue end of the spectrum. A still greater percentage of these blue and violet rays is absorbed by the "Noglare" glass, which may be used with either Crystal Ray or Sterling Ray reflector. In contrast with modern street illuminants, a headlight beam of this color is somewhat more conspicuous.

Both types of headlights are listed with clear glass in plain door, but a grid door will be furnished, if ordered. These grid doors afford protection to the glass. The door is hinged at the top and is drawn tight against the case by means of a lever catch. The case is dust and weather-proof.

The portable headlight is equipped with hanger hooks, bumper studs, feet and handle, and is designed to be mounted on a dash hanger, screwed to the dash. By means of the bumper studs, the beam of light can be levelled on the track. The stationary headlight is intended to be bolted permanently to the car dash by means of eight bolts. If desired, the supporting flange may be located anywhere on the casing so that the headlight can be recessed in the dash.

These headlights are regularly arranged to accommodate any focus type Mazda lamp of 250 watts or less, in a G-30 bulb or smaller.

Alternative Arrangements for Headlights

Prices given in this table are to be added to list prices given on page 39	Add to List Prices
Grid door, in place of plain door.	\$1.25
"Noglare" glass, in place of clear glass	5.10

List prices referred to below are given on page 39.

If specified on the order, above headlights will be furnished with Sterling Ray aluminum reflectors at a decrease of \$0.75 in the list prices for headlights with standard Sterling Ray reflectors, which are nickel-plated copper.

Imperial Incandescent Headlights for Interurban Service

Type SCP—Portable

Pressed Steel

Type SCS—Stationary

Lamp is Mounted Vertically

Take 23 to 250-Watt Focus Type Mazda Lamp



Type SCP—Portable



Type SCS—Stationary

***Type SCP Headlights—Portable—12-Inch Reflector**

Reflector Dimen.	Style of Reflector	Catalog Number	Shipping Weight	*List Price
Dia. 12" Focus 2 ¹⁷ / ₃₂ "	Headlight with Crystal Ray Reflector . .	28567	53 lbs.	\$33.50
	Headlight with Gold Ray Reflector . . .	28568	53 lbs.	33.50
	Headlight with Sterling Ray Reflector . .	28569	50 lbs.	29.00

Type SCS Headlights—Stationary—12-Inch Reflector

Dia. 12" Focus 2 ¹⁷ / ₃₂ "	Headlight with Crystal Ray Reflector . .	28570	50 lbs.	\$25.95
	Headlight with Gold Ray Reflector . . .	28571	50 lbs.	25.95
	Headlight with Sterling Ray Reflector . .	28572	47 lbs.	21.45

*For headlight arranged for grounded circuit (one plug), deduct \$1.15 from list price.

Net Weights: Twenty-five pounds less than shipping weights.

Shipping dimensions: 19 x 18 x 12 inches.

Following are the parts necessary for the complete equipments: **Single End Equipment**—One headlight, one resistance, one fuse block, one fuse, one switch, one dash hanger, and two single pole receptacles. **Double End Equipment**—One headlight, one resistance, one fuse block, one fuse, two dash hangers, two switches and four single pole receptacles.

Above list prices do not include incandescent lamps.

Resistances, page 45. Fuse, fuse block and dash hanger, page 45. Switches, page 47. Plugs, receptacles and boxes, page 44.

Information regarding alternative arrangements of headlights, page 38. Dimensions and drilling template, page 54. Wiring diagram, page 48. Assembled and detailed parts, pages 63, 64 and 65.

Imperial Incandescent Headlight for Mine Locomotives



Type MC Imperial Incandescent Headlight Installed

Imperial Incandescent Headlight for Mine Locomotives

Type I

Clear Glass in Grid Door

Takes 23 to 56-Watt Regular Filament or 23 to 34-Watt Focus Type Mazda Lamp



Type I headlight is designed for rigid mounting on a mine locomotive and to withstand the roughest usage. Case and door are heavy cast iron, the latter having two ribs, cast with the frame, to protect the glass, and both are finished with special weather-proof black enamel.

On the bottom of the case, and cast with it, are two feet. These feet are drilled for bolts, by means of which the headlight is fastened to the locomotive.

The reflector is parabolic, spun from sheet aluminum, and is reinforced by a cast-iron back. The lamp socket is adjustable, permitting lamps of various voltages to be adjusted to the focal point of the reflector. Two headlights are required for each locomotive and are usually connected in series. They can be operated on any line voltage between 220 and 300 volts, if lamps that normally require one-half the line voltage are used, but lamps of any voltage may be burned in series with an external resistance.

Type I Headlights with Clear Glass in Grid Door—Cast-Iron Case

Diameter Reflector	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
7½ inches	Headlight with Crystal Glass Reflector	28713	28 lbs.	\$7.85
	Headlight with Polished Aluminum Reflector	28108	28 lbs.	7.35
	Headlight with Nickel-plated Copper Reflector	28626	28 lbs.	7.35

Headlight will be furnished with receptacle adjusted for 23 to 56-watt regular filament Mazda lamp. If specified on order, headlight will be equipped with receptacle adjusted for 23 to 34-watt focus type Mazda lamp.

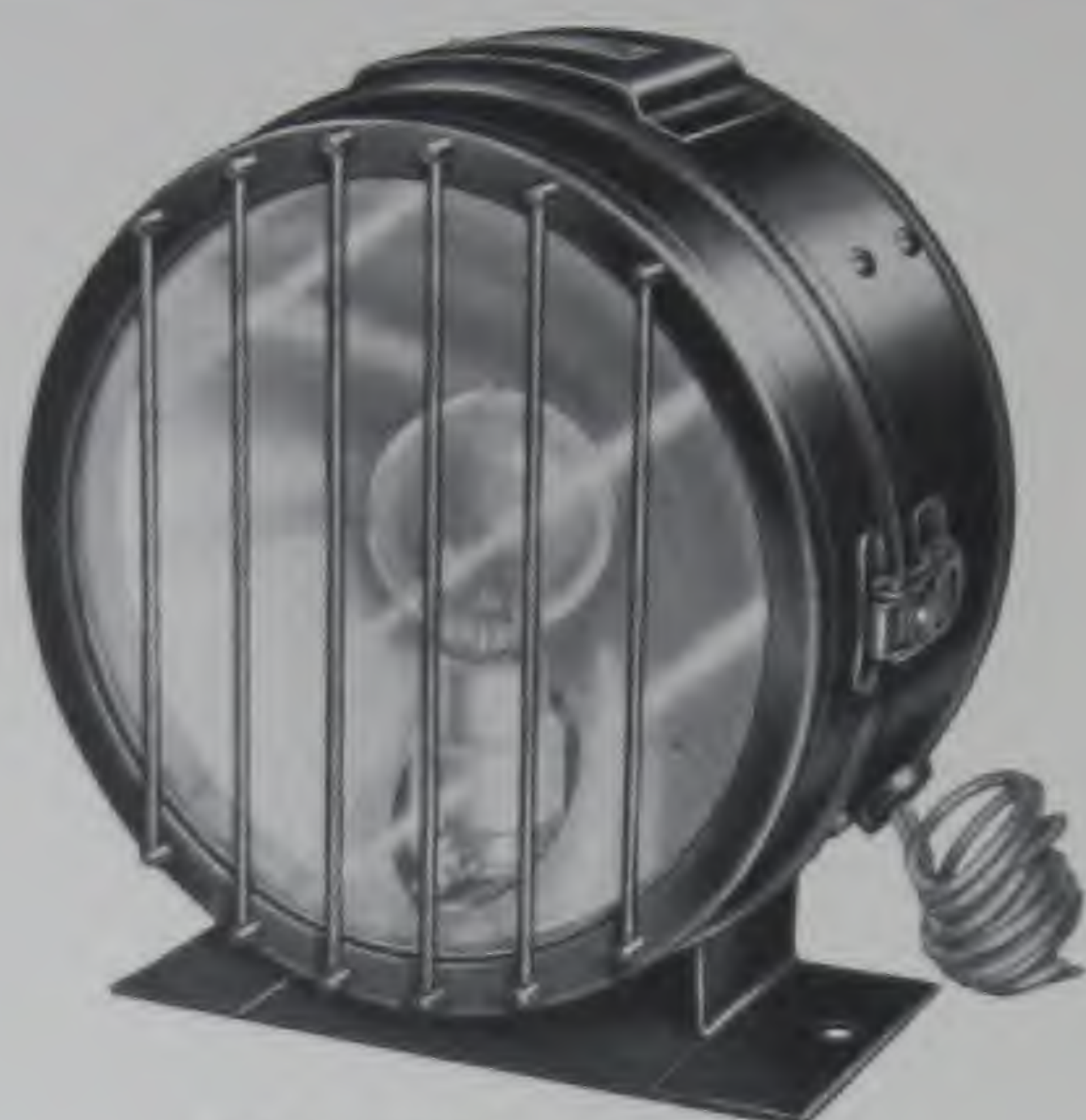
Net weight of headlight, 17 lbs. Shipping dimensions, 14 x 12 x 10 inches.

Above list prices do not include incandescent lamps.

Dimensions and drilling template, page 33. Wiring diagram, page 49. Assembled and detailed parts, page 33.

Imperial Incandescent Headlight for Mine Locomotives Type MC

Stationary Base—Clear Wire Glass in Grid Door— $9\frac{5}{8}$ -Inch Reflector
Takes 23 to 94-Watt Focus Type Mazda Lamp



With Pressed Steel Case



With Cast-Iron Case

Type MC incandescent headlight is made both with pressed steel and cast-iron cases. It is designed for permanent mounting on mine locomotives, but can be mounted on a turret base (Cat. No. HL5671, page 65). The door, which has grids to protect the glass, is hinged at the side and is locked shut by a lever catch. No moisture or dirt can get into the headlight when the door is closed.

The lamp receptacle is mounted at the bottom of the case on a bracket which has sufficient spring to relieve the lamp of any sudden shocks, and is adjustable, so that the lamp filament can be located at the focal point of the reflector. This is a very necessary feature because of the variation in the light center lengths of focus type Mazda lamps.

The headlight is listed with the following reflectors: Crystal Ray, Gold Ray and Sterling Ray, all of which are true paraboloids.

Type MC headlight is primarily designed for haulage motors where an illumination of 400 to 700 feet is required. For this service the higher wattage focus type Mazda lamps are recommended.

Type MC Headlights

With Pressed Steel Cases				With Cast-Iron Cases			
Catalog Number	Shipping Weight	List Price Each	Style	Catalog Number	Shipping Weight	List Price Each	
28501	22 $\frac{3}{4}$ lbs.	\$18.70	Headlight, Crystal Ray Reflector	28504	37 $\frac{3}{4}$ lbs.	\$20.00	
28502	22 $\frac{3}{4}$ lbs.	18.70	Headlight, Gold Ray Reflector	28505	37 $\frac{3}{4}$ lbs.	20.00	
28500	21 lbs.	16.05	Headlight, Sterling Ray Reflector	28503	24 $\frac{1}{2}$ lbs.	17.35	

Wiring Equipments for MC Headlights

220-300 Volts		Equipments	500-600 Volts	
Catalog Number	List Price Each		Catalog Number	List Price Each
28663	\$7.83	Single End Wiring Equipments (main resistance, fuse, . . . fuse block and one-way snap switch)	28665	\$ 9.33
28664	8.83	Double End Wiring Equipment (main resistance, fuse, . . . fuse block and two-way snap switch)	28666	10.33

Overall dimensions: Height, 12 $\frac{1}{8}$ inches; width, 12 inches; depth, 6 $\frac{1}{2}$ inches.

Shipping dimensions: 17 x 15 x 9 $\frac{1}{2}$ inches.

Above list prices do not include incandescent lamps. Dimensions and drilling template, page 55. Wiring Diagram, pages 48 and 49. Assembled and detailed parts, pages 65 and 66. Turret Base (HL5671), page 65. Above resistances, page 45.

Imperial Incandescent Headlight for Mine Locomotives

Type MD

Stationary Base—With or Without Self-Contained Resistance

Clear Wire Glass in Grid Door—6½-Inch Reflector

Takes 25-Watt, 24-Volt Lamp for Bayonet Joint Socket No. 1100



With Pressed Steel Case



With Cast-Iron Case

Type MD incandescent mine headlight has either a pressed steel or cast-iron case and is furnished with or without self-contained resistance. It is for use where little space is available.

The door has grids to protect the glass. It is hinged at the top and is locked shut by two lever catches. No moisture or dirt can get into the headlight when the door is properly closed.

The resistance is in a compartment back of the headlight case. It will be wound for any voltage up to 300 for a single end equipment or up to 600 volts for a double end equipment.

When the voltage is between 300 and 600, it becomes necessary to use two headlights and connect the two resistances in series. The wiring is so arranged that by use of a two-way switch either of the headlights can be operated, as desired.

Type MD Headlight With Pressed Steel Case

With Self-Contained Resistance				Without Self-Contained Resistance		
Catalog Number	Shipping Weight	List Price Each	Style of Reflector	Catalog Number	Shipping Weight	List Price Each
28641	24 lbs.	\$18.70	Headlight, Crystal Ray Reflector	28669	17 lbs.	\$13.70
28510	23 lbs.	18.20	Headlight, Sterling Ray Reflector	28670	16½ lbs.	13.20

With Cast-Iron Case

With Self-Contained Resistance				Without Self-Contained Resistance		
28642	31 lbs.	\$20.00	Headlight, Crystal Ray Reflector	28671	22¼ lbs.	\$15.00
28511	30 lbs.	19.50	Headlight, Sterling Ray Reflector	28672	21¼ lbs.	14.50

Wiring Equipments for MD Headlights Without Self-Contained Resistance

220-300 Volts		Equipment	500-600 Volts	
Cat. No.	List Price		Cat. No.	List Price
28667	\$7.70	Single End Equipment (main resistance, fuse, fuse block and one-way snap switch)	28673	\$ 9.20
28668	8.70	Double End Equipment (main resistance, fuse, fuse block and two-way snap switch)	28674	10.20

In ordering above headlight, specify maximum, minimum and average voltage of trolley circuit upon which it is to be used, so that proper resistance will be furnished.

If specified on the order, above headlight will be furnished with "Noglare" glass in door, at an increase of \$2.70 in list price.

Overall dimensions: Height, 8¾ inches; width, 8 inches; depth, 7¾ inches.

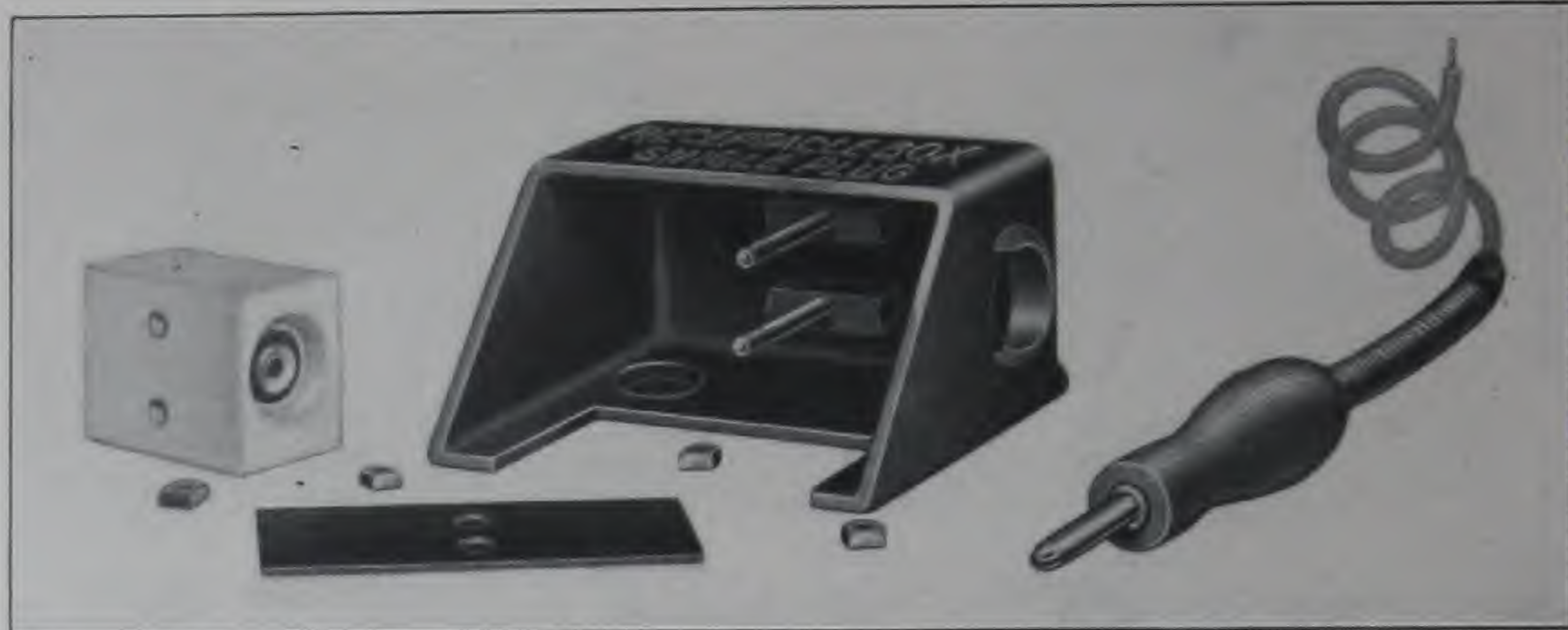
Shipping dimensions: 14 x 11 x 11½ inches.

Above list prices do not include incandescent lamps.

Dimensions and drilling template, page 55. Wiring diagram, page 49. Assembled and detailed parts, pages 66 and 67. Above resistances, page 45.

Plugs, Receptacles and Boxes

For Single and Double Pole Equipments



Single Plug Receptacle Box, Unassembled

Crouse-Hinds receptacle boxes for single and double plug receptacles can be bolted directly on the front of the dash, away from the splashing of mud and water which, where no protection is afforded, may cause leakage in the circuit. The box is a one-piece iron casting and will withstand severe usage. Having a sloping top and straight sides, the box sheds water.

Two studs, with their heads firmly embedded in the casting, project downward from the top of the box and extend through holes in the porcelain block, and the steel plate on the bottom. Lock nuts on the studs lock together the box, porcelain receptacle and plate. Current-carrying wires enter the box through a hole in the back.

Plugs, Receptacles and Boxes

Description	Catalog Number	List Price Each
Box complete with Single Plug Receptacle, but without Plug . . .	25501	\$2.35
Box complete with Double Plug Receptacle, but without Plug . . .	25502	3.45
Single Plug with Five Feet of Cable	HL2103	1.60
Double Plug with Five Feet of Cable	HL2137	2.30
Single Plug Receptacle	HL2105	.85
Double Plug Receptacle	HL2141	1.70
Porcelain Block for HL2105	HL105	.40
Porcelain Block for HL2141	HL141	.80
Plug Receptacle less Porcelain Block for HL2105 and 2141	HL2108	.50
Box only. For Single Plug Receptacle	25503	1.50
Box only. For Double Plug Receptacle	25504	1.75

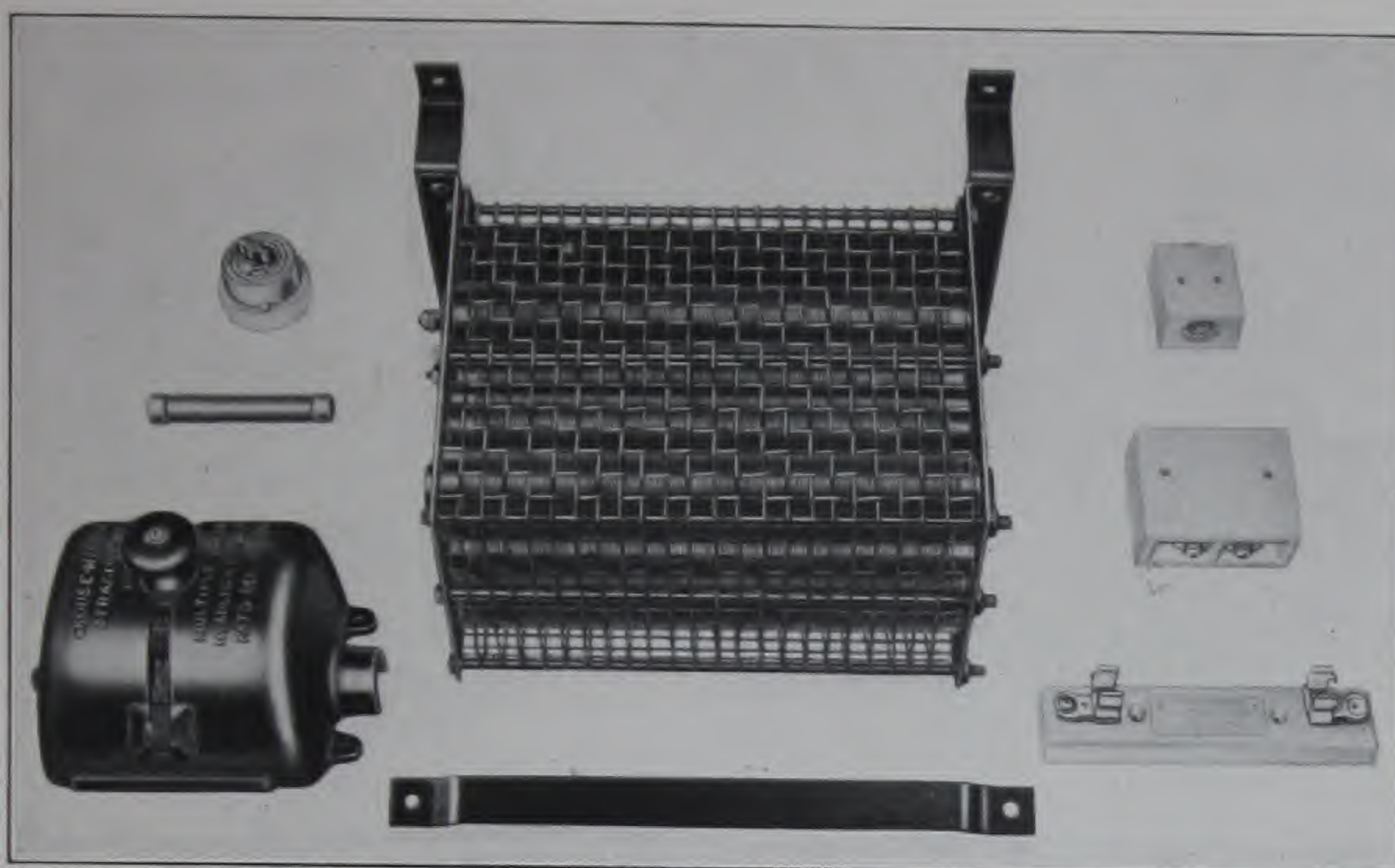
Prices on removable unit resistances will be furnished on application.

All resistance tubes for use with Crouse-Hinds Imperial incandescent headlights consist of hollow porcelain tubes, 1½ inches in diameter, wound with high resistance wire which has practically a zero temperature coefficient of resistance.

The resistance wire will not rust and is non-corrosive. It can be used in any climate without deterioration and is not affected by moisture. Furthermore, it will withstand extremely high temperatures without oxidizing, scaling or becoming brittle.

The porcelain tubes are bolted securely between steel plates and are protected by half-inch mesh screen. Suitable binding posts are provided for connections.

Resistances and Wiring Equipment Parts



Resistance and Wiring Equipment Parts

Resistances

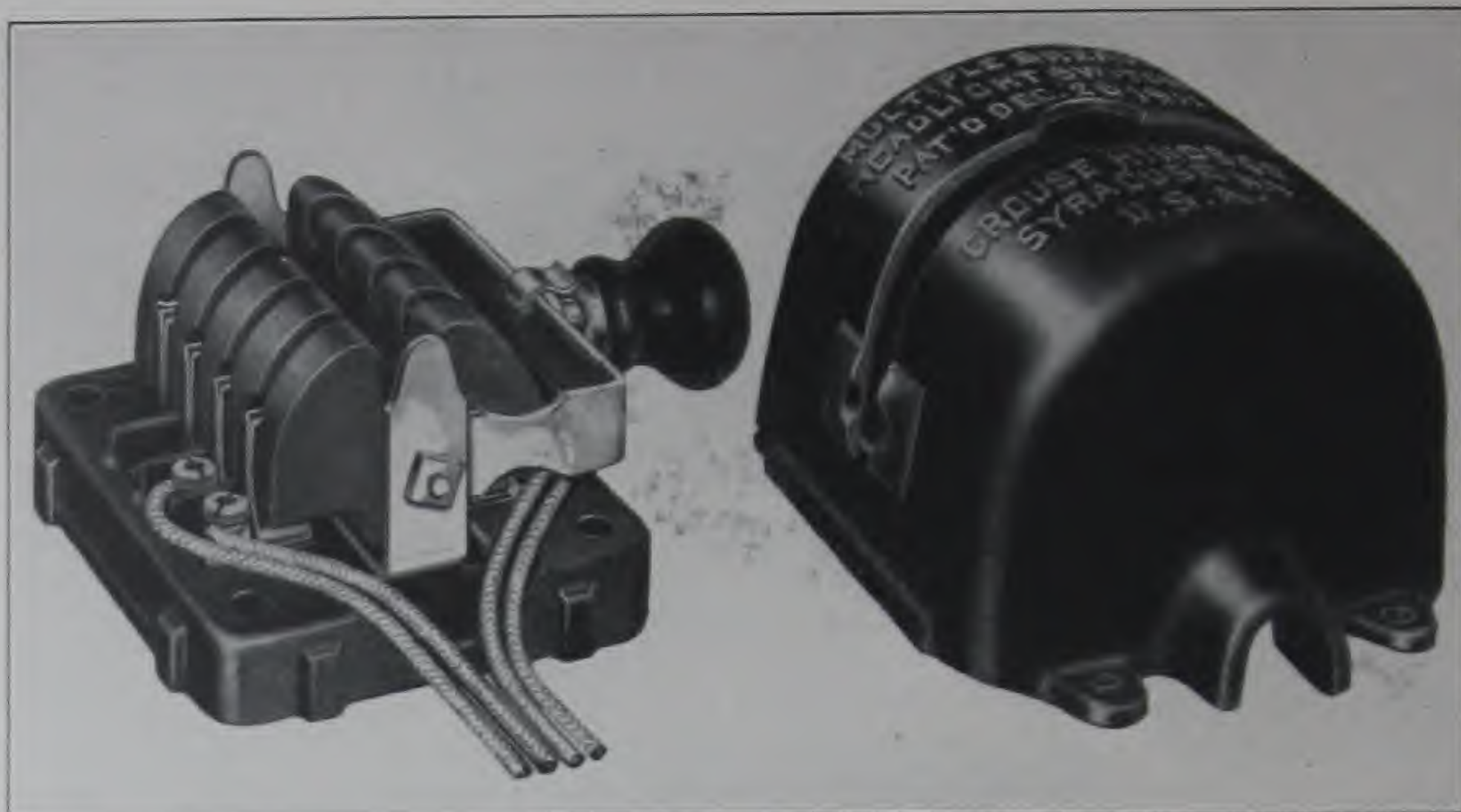
Headlight Lamp		Style of Resistance	Trolley Voltage					
			250-300 Volts			500-650 Volts		
Watts	Volts		Catalog Number	Shipping Weight	List Price Each	Catalog Number	Shipping Weight	List Price Each
25	24	Main	28675	12 lbs.	\$ 5.00	28680	15 lbs.	\$ 6.50
56	105-130	Main	28676	12 lbs.	4.60	28681	15 lbs.	5.00
56	105-130	Main and dimming	28677	15 lbs.	6.00	28682	15 lbs.	7.90
72	105-130	Main	28586	12 lbs.	4.60	28602	15 lbs.	5.00
72	105-130	Main and dimming	28587	15 lbs.	6.00	28603	15 lbs.	7.90
94	105-130	Main	28588	12 lbs.	5.00	28604	15 lbs.	6.50
94	105-130	Main and dimming	28589	15 lbs.	6.50	28605	15 lbs.	9.35
100	30-34	Main	28590	15 lbs.	8.70	28606	25 lbs.	12.25
100	30-34	Main and dimming	28591	25 lbs.	12.25	28607	40 lbs.	15.10
150	30-34	Main	28592	15 lbs.	8.70	28608	25 lbs.	12.25
150	30-34	Main and dimming	28593	25 lbs.	12.25	28609	40 lbs.	15.10
150	105-130	Main	28678	12 lbs.	7.15	28683	15 lbs.	9.35
150	105-130	Main and dimming	28679	15 lbs.	9.35	28684	15 lbs.	12.25
180	90	Main	28594	15 lbs.	8.70	28610	25 lbs.	12.25
180	90	Main and dimming	28595	25 lbs.	12.25	28611	25 lbs.	15.10
250	105-130	Main	28596	15 lbs.	8.70	28612	25 lbs.	12.25
250	105-130	Main and dimming	28597	25 lbs.	12.25	28613	25 lbs.	15.10
320	80	Main	28598	25 lbs.	8.70	28614	25 lbs.	12.25
320	80	Main and dimming	28599	25 lbs.	12.25	28615	40 lbs.	15.10
500	105-130	Main	28600	25 lbs.	8.70	28616	25 lbs.	12.25
500	105-130	Main and dimming	28601	25 lbs.	12.25	28617	40 lbs.	15.10

Miscellaneous Wiring Equipment Parts

Description	Catalog Number	List Price
Fuse Block. For N. E. C. Cartridge fuse	HL133	\$1.00
Fuse. 600 volts, 6 amperes. For fuse block HL133	HL134	.75
Dash Hanger	HL85	.30

For notes on resistances, see opposite page.

Crouse-Hinds Multiple Break Headlight Switches



Crouse-Hinds Multiple Break Switch, Cover Removed

The Multiple Break switch is a distinct improvement over the snap switch, or any other type of switch designed for headlight service. It is for use on any circuit not over 600 volts and 10 amperes capacity.

The base is made of a strong composition which is impervious to moisture and is not affected by heat. The crossbar, which holds the contact blades, is made of the same composition as the base.

Knife blade and corresponding beveled contacts are used. The ends of the blades are so shaped that when the switch is being closed or opened, the lower edges of blades and tops of clips are parallel. This is a feature of considerable importance, as instant contact or release is obtained along the full width of contact. This form of construction eliminates damage to blades and contacts, which occurs where a point on the edge of the blade touches only a corner of the contact when the switch is being opened or closed.

Between each set of contacts, and extending well above them, are barriers that effectually prevent arcing from one set of contacts to another. These barriers are a single piece of molded composition, similar to that used for the base.

Complete insulation of handle and case from current-carrying parts is secured by having the blades molded into the composition crossbar. Another feature is a spring knob handle which holds the switch closed by engaging a recess on the case. Furthermore, the crossbar is provided with a very strong spring which insures absolute centering of switch when blades are released from closed position. This centering is practically instantaneous, as the construction is such as to eliminate any drag of the handle upon the top of the case.

The position of the handle indicates whether the switch is on or off.

These switches are made in four styles to control incandescent headlights wired with external resistances in the following manner. (1) Single pole, single throw; (2) Single pole, double throw; (3) Double pole, single throw, and (4) Double pole, double throw. All four styles of switches are the same, except in the connections.

Two styles of knob handles—Regular and Quick-Removable—are made for these switches. The Quick-Removable handle can be taken off by exerting a moderate pull, and put on again with an equal pressure. This can only be done, however, when the switch is in an open position. Some railway electricians consider the removable handle an advantage for double end equipments, in that it prevents unauthorized persons from operating the switch.

Complete listings of Multiple Break switches with both forms of knob handles are given on the following page.

Multiple Break Headlight Switches—Continued

One-Way, Two-Way

Multiple Break Headlight Switches, with Regular Handle

Description	Catalog Number	List Price Each
Single pole, single throw	HL110S	\$4.40
Single pole, double throw	HL140S	4.40
*Double pole, single throw	HL150S	4.40
*Double pole, double throw	HL151S	4.40

Multiple Break Headlight Switches, with Quick-Removable Handle

Single pole, single throw	HL152S	\$4.40
Single pole, double throw	HL153S	4.40
*Double pole, single throw	HL154S	4.40
*Double pole, double throw	HL155S	4.40

*Not generally used with incandescent headlights.

Parts of Multiple Break Switch

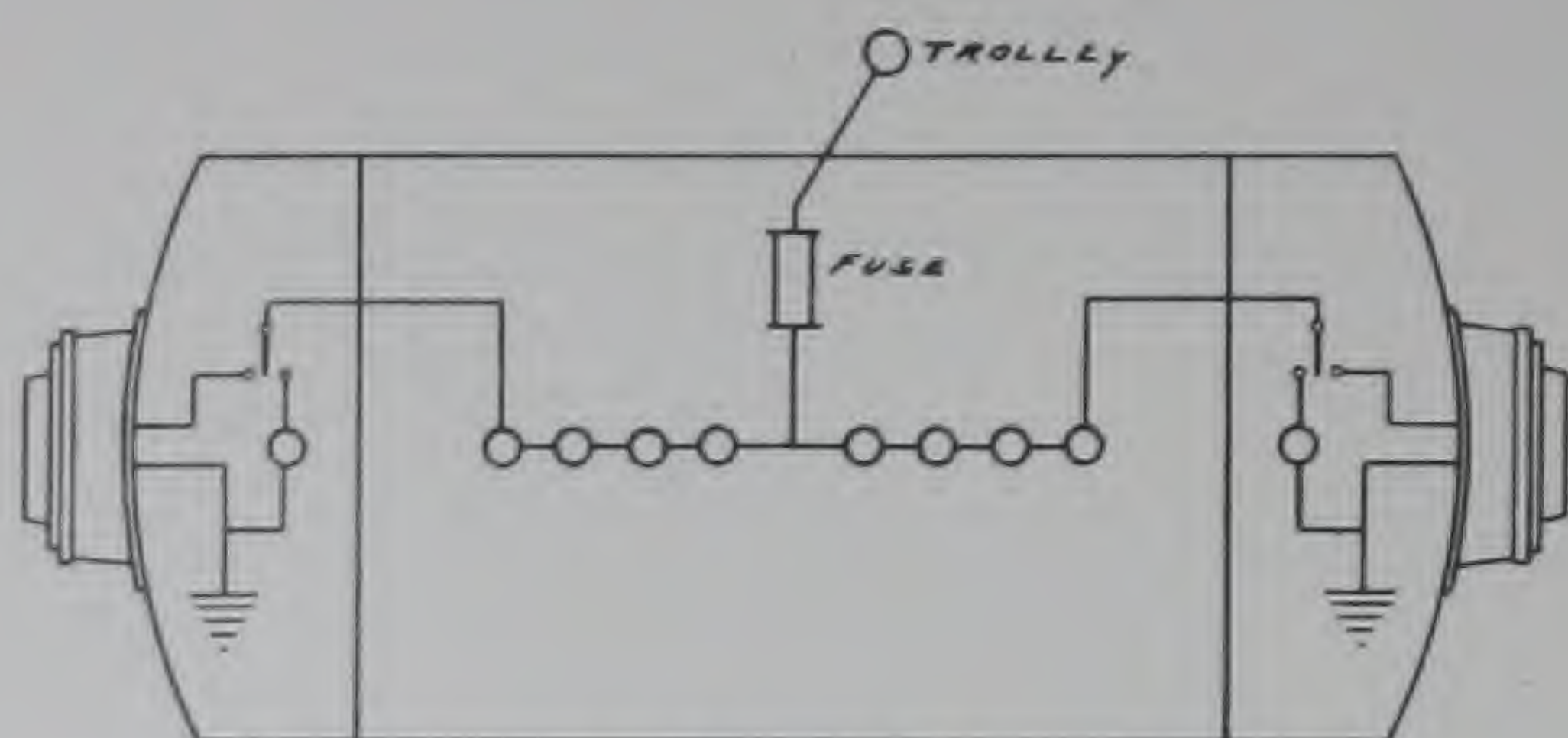
Description	Catalog Number	List Price Each
Cast-Iron Cover	HL6600	\$ 1.70
Moulded Base	HL6601	1.15
Base Cover	HL6602	.45
Wood Screws for Base Cover (per doz.)	HL6603	.14
Barrier	HL6604	.95
Standard Yoke	HL6605	.35
Crossbar Yoke with Spring Complete	HL6606	.45
Crossbar with Contact Blades	HL6607	1.40
Screw for Holding Crossbar to Yoke (per doz.)	HL6099	.14
Screw for Holding Stem Yoke to Base (per doz.)	HL6608	.14
Hinge Pin	HL6609	.30
Nut for Hinge Pin (per doz.)	HL5104	.17
Spring for Hinge Pin	HL6610	.30
Handle	HL6611	.45
Removable Handle Complete	HL6672	1.75
Handle Stud	HL6612	1.15
Handle Spring	HL6613	.35
Washer for Handle, No. 10 Brass, $\frac{3}{16} \times \frac{9}{16}$ -inch (per doz.)	HL6689	.28
Screw to Hold Removable Handle in Place (per doz.)	HL6614	.14
Screw to Hold Stationary Handle in Place (per doz.)	HL6673	.28
Contact Clips	HL6615	.30
Screw for Holding Contact Clips to Base (per doz.)	HL6616	.14
Connection Screw (per doz.)	HL6617	.14
No. 8 Iron Washer for Screws (per doz.)	HL6618	.07
1 $\frac{1}{4}$ -inch Connection Strip (Copper)	HL6619	.12
2 $\frac{1}{2}$ -inch Connection Strip	HL6620	.17
Lead for Reversing Connection	HL6621	.06
Binding Nuts (per doz.)	HL6622	.17

Snap Switches

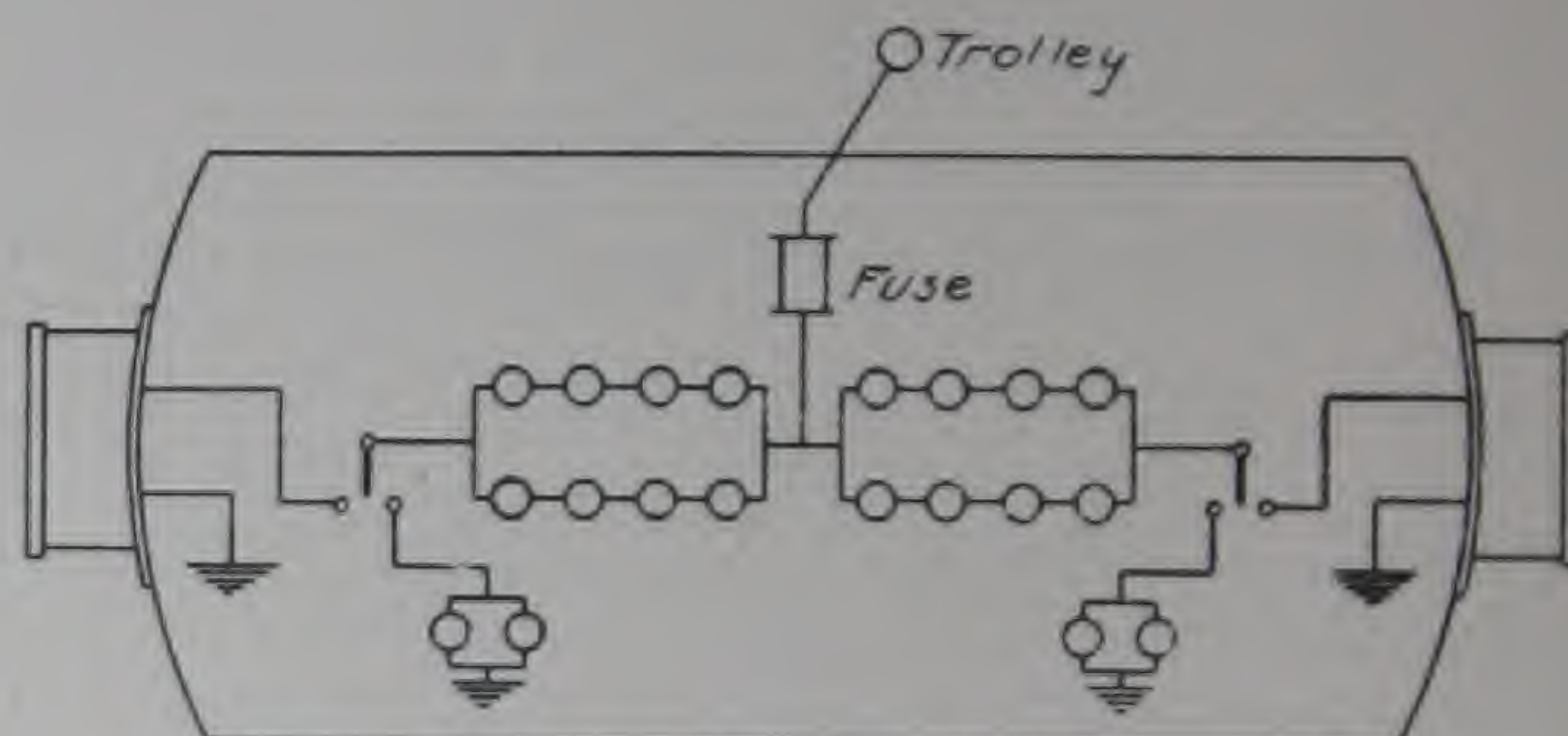
Description	Catalog Number	List Price Each
One-way Snap Switch	HL110	\$1.15
Two-way Snap Switch	HL140	2.30

Dimensions Multiple Break headlight switch—Height, 6 inches; width, 5 $\frac{1}{2}$ inches; length, 7 $\frac{1}{2}$ inches. Shipping dimensions, 7 x 8 x 9 inches.

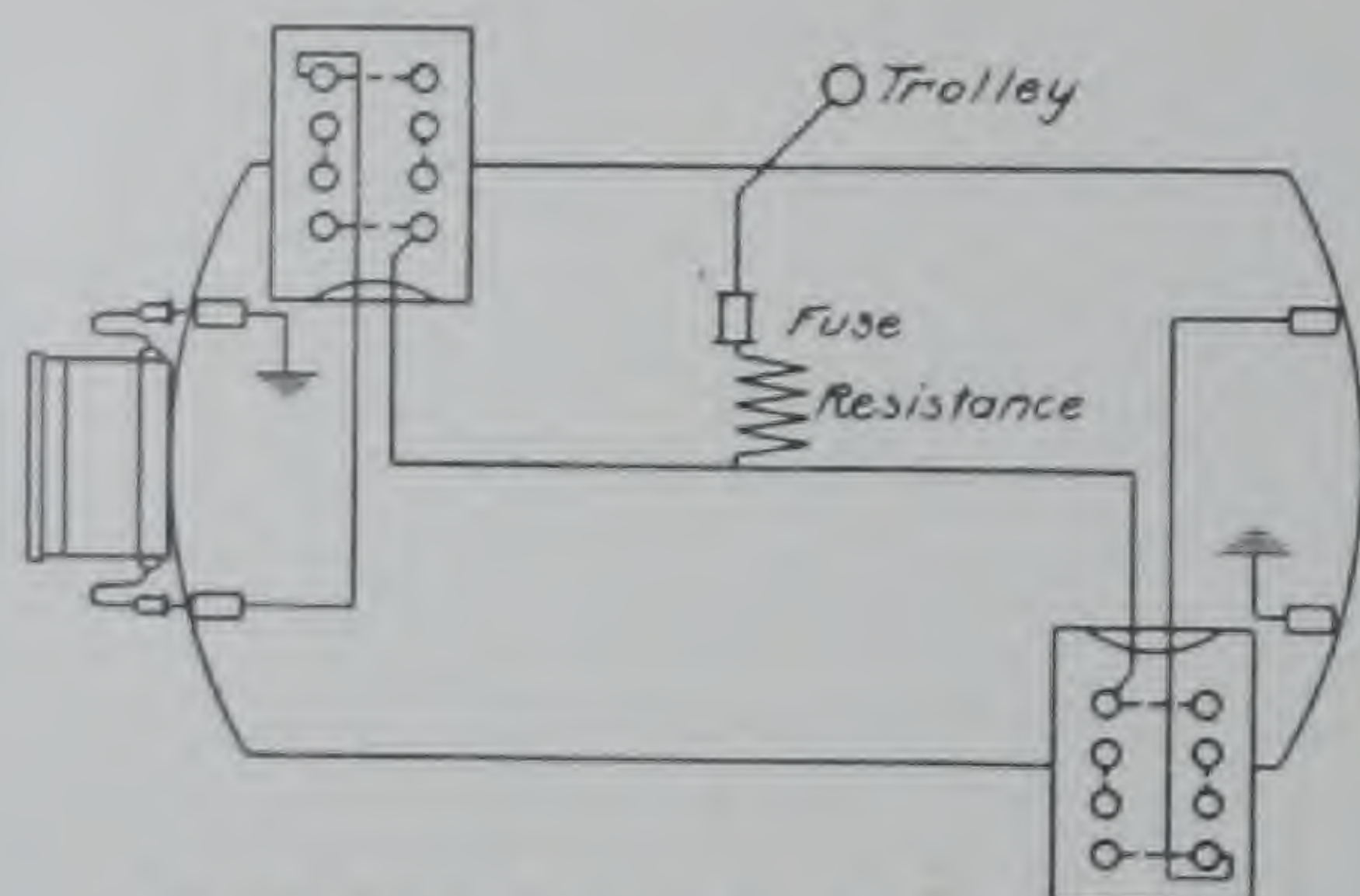
Wiring Diagrams For Crouse-Hinds Imperial Incandescent Headlights



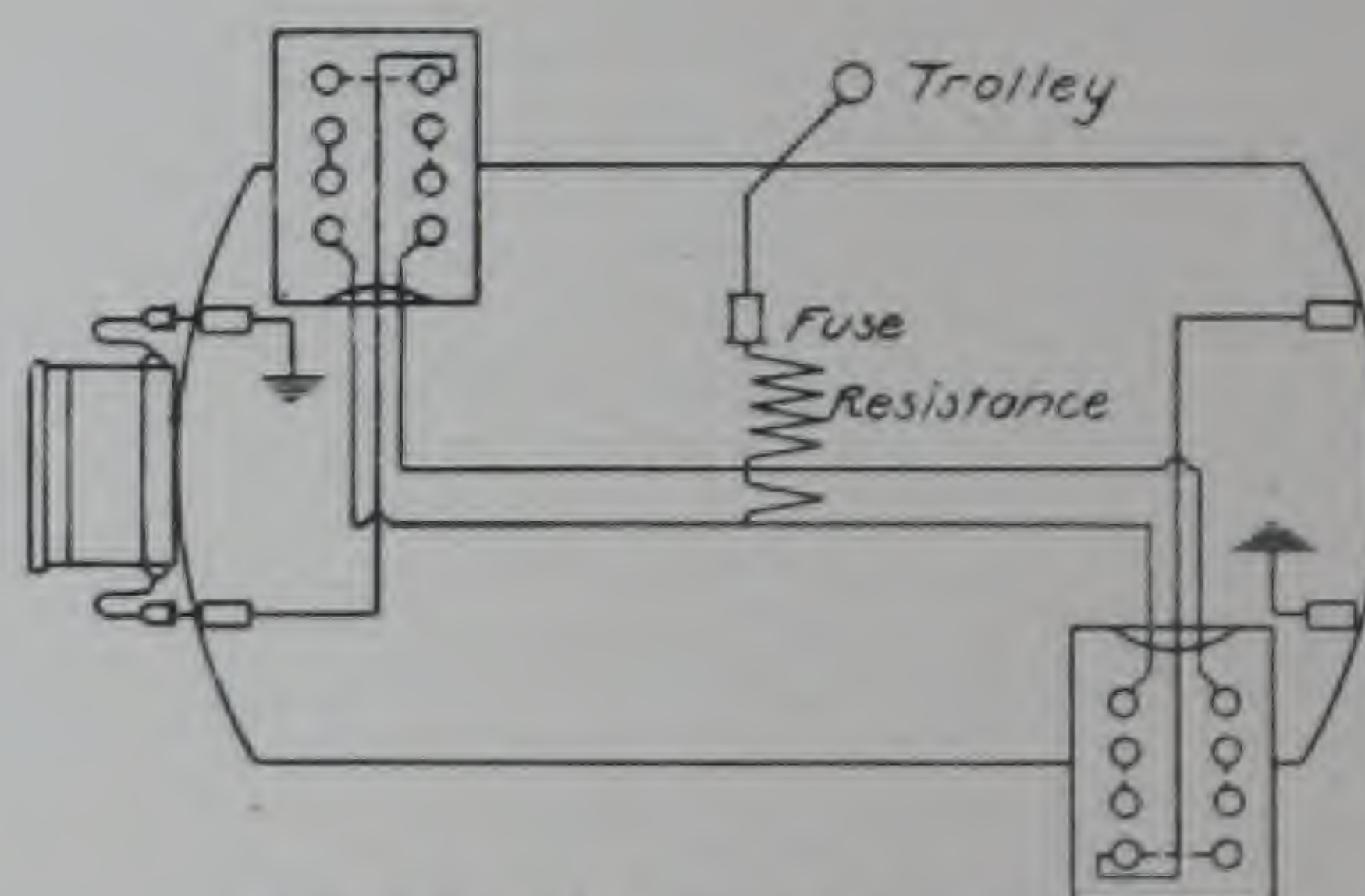
Headlight to Operate in Series with
One Circuit of Car Lamps



Headlight to Operate in Series with
Two Circuits of Car Lamps



Headlight to Operate in Series with
External Resistance, Normal Operation Only



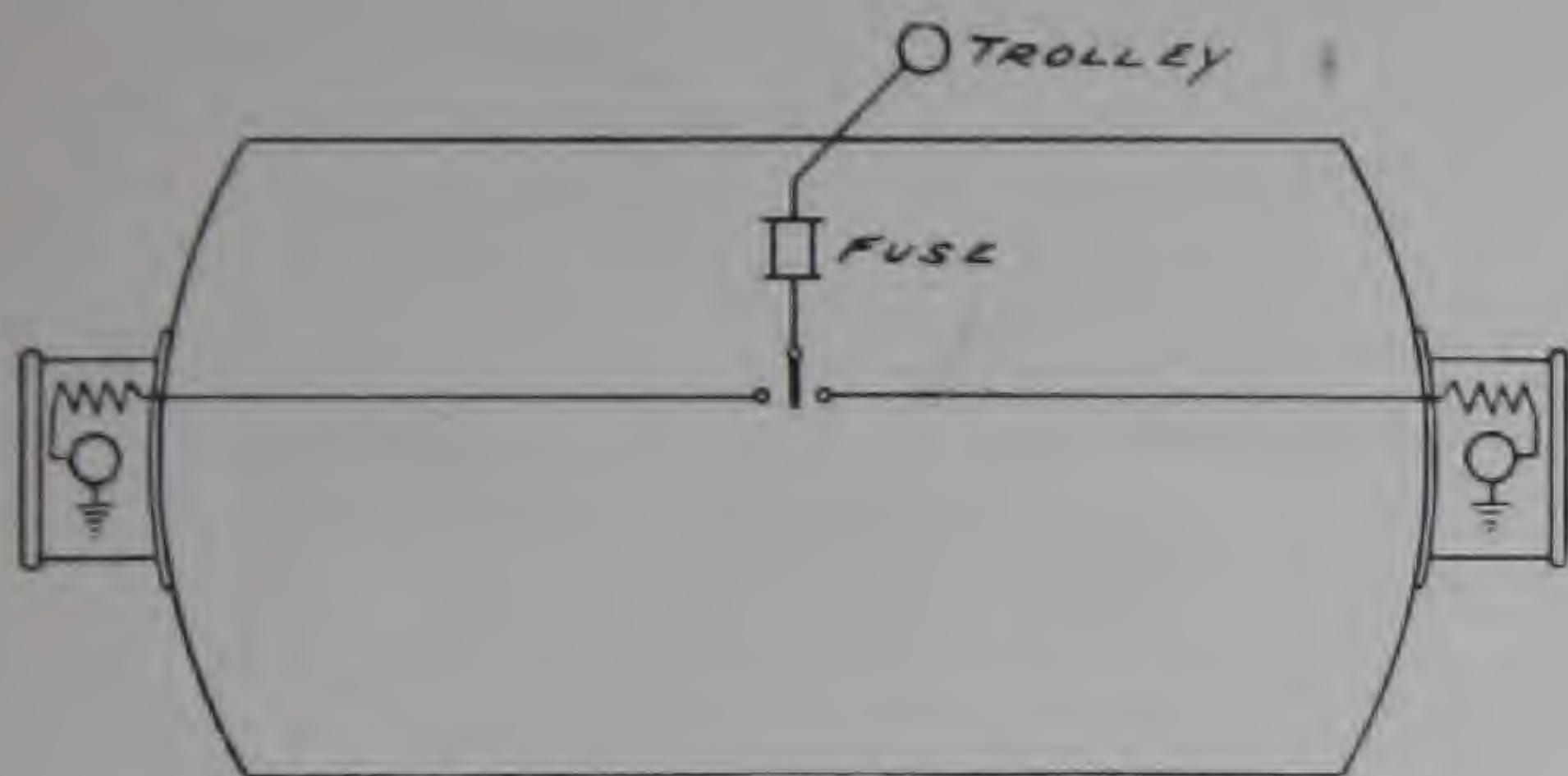
Headlight to Operate in Series with
External Resistance, Normal and Dimming Operation

On this page and on page 49 are presented a few of the more common wiring diagrams for incandescent headlights.

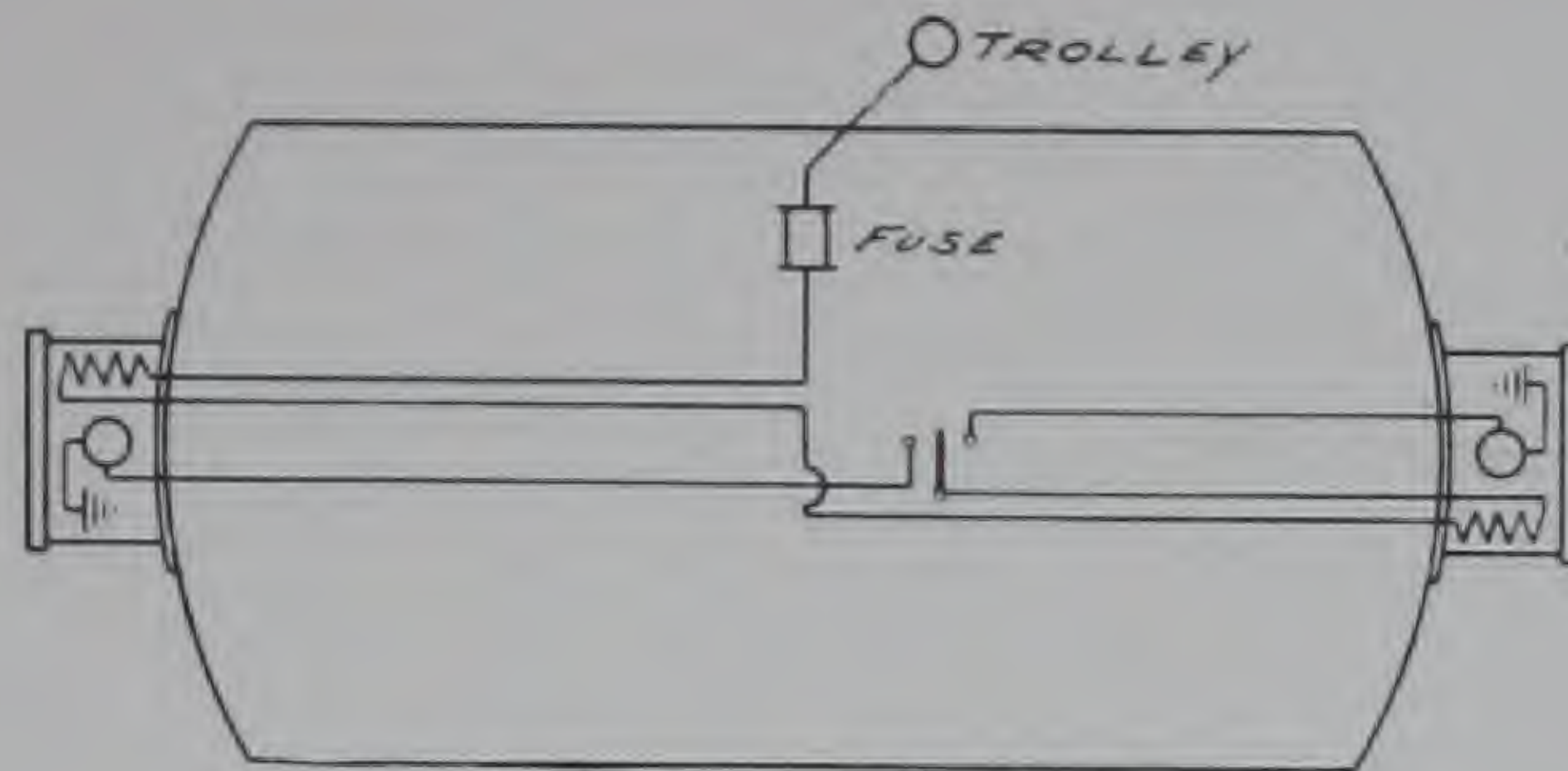
The Crouse-Hinds Company will be glad to cooperate with any of its customers in working out special connections for their headlight circuit.

Wiring Diagrams

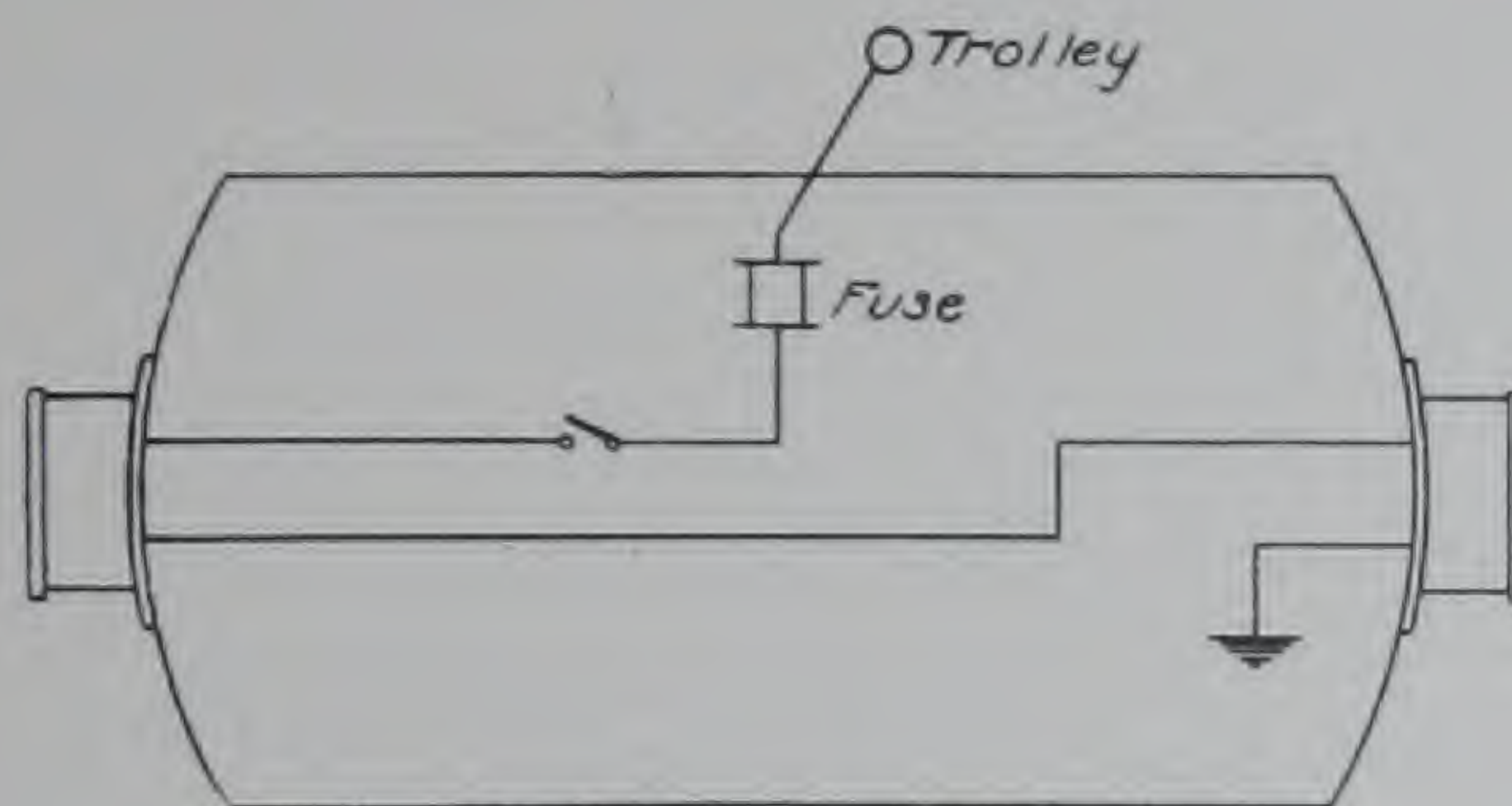
For Crouse-Hinds Imperial Incandescent Headlights



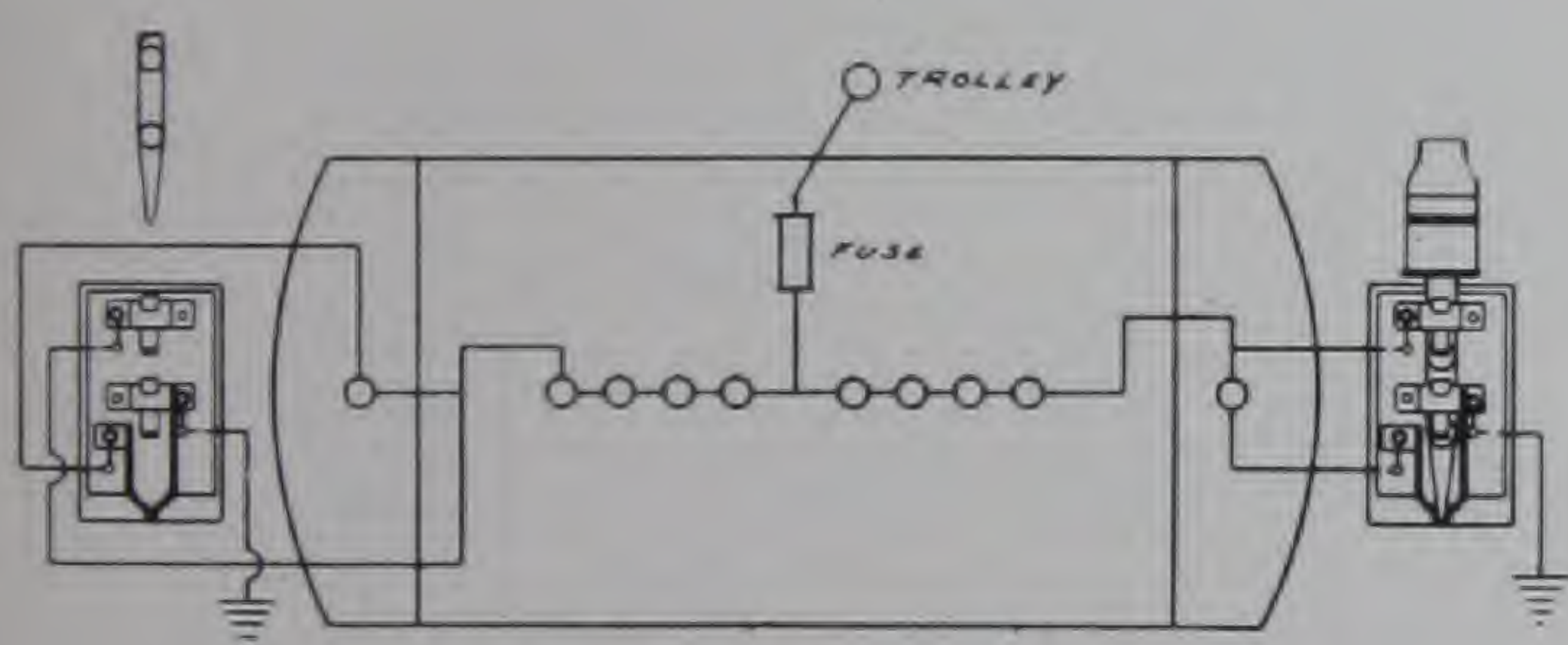
Type MD (Mine) Headlight
Self-Contained Resistance up to and
Including 300 Volts



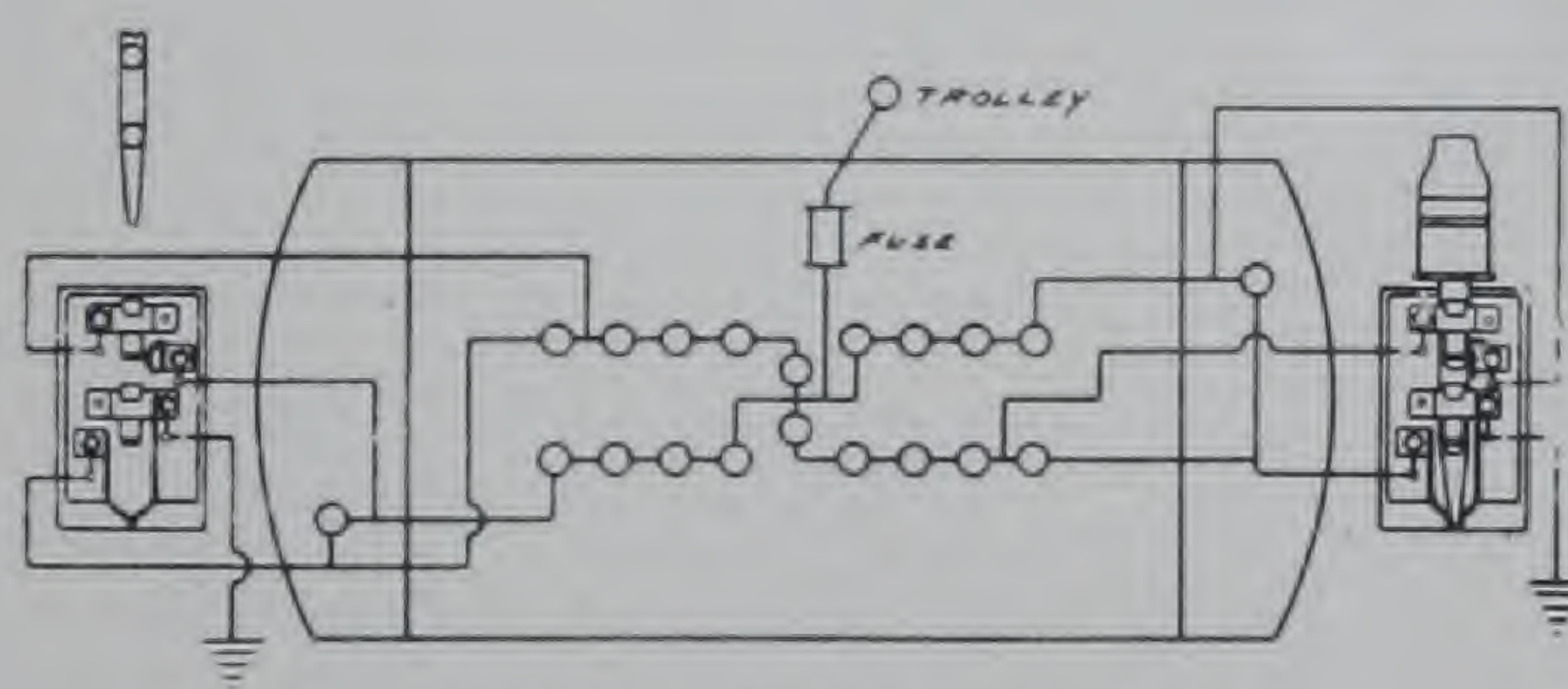
Type MD (Mine) Headlight
Self-Contained Resistance for
500 Volts and Over
(Resistances Must Operate in Series)



Mine Headlights Where
Lamp Voltage is One-Half the Circuit Voltage,
Both Headlights Burning All the Time



Syracuse Changeable, Front or Side
Contact. Headlight to Operate in Series
with One Circuit of Car Lamps

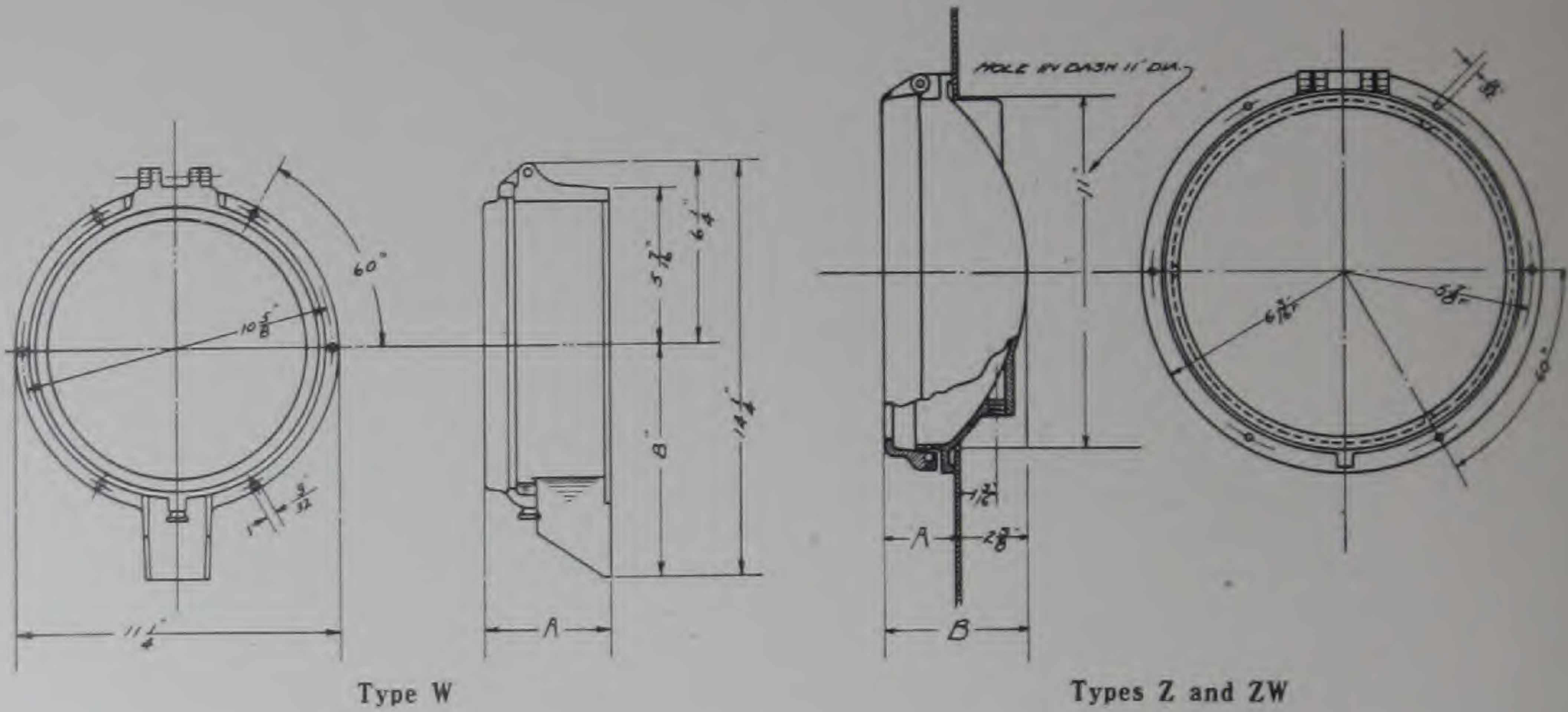


Syracuse Changeable, Combined Front
and Side Contacts. Headlight to Operate in Series
with Two Circuits of Car Lamps

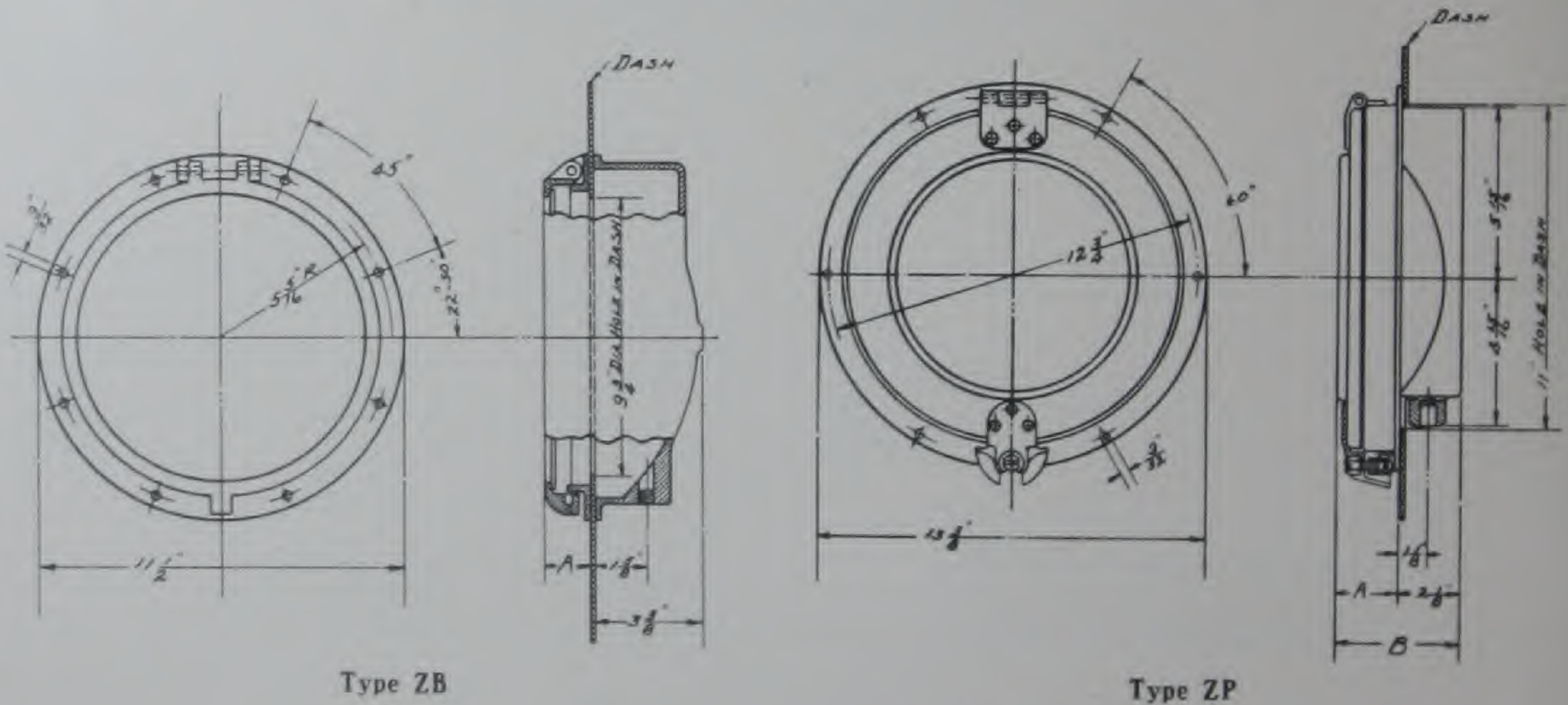
On this page and on page 48 are presented a few of the more common wiring diagrams for incandescent headlights.

The Crouse-Hinds Company will be glad to coöperate with any of its customers in working out special connections for their headlight circuit.

Dimension Drawings and Drilling Templates For Crouse-Hinds Imperial Incandescent Headlights

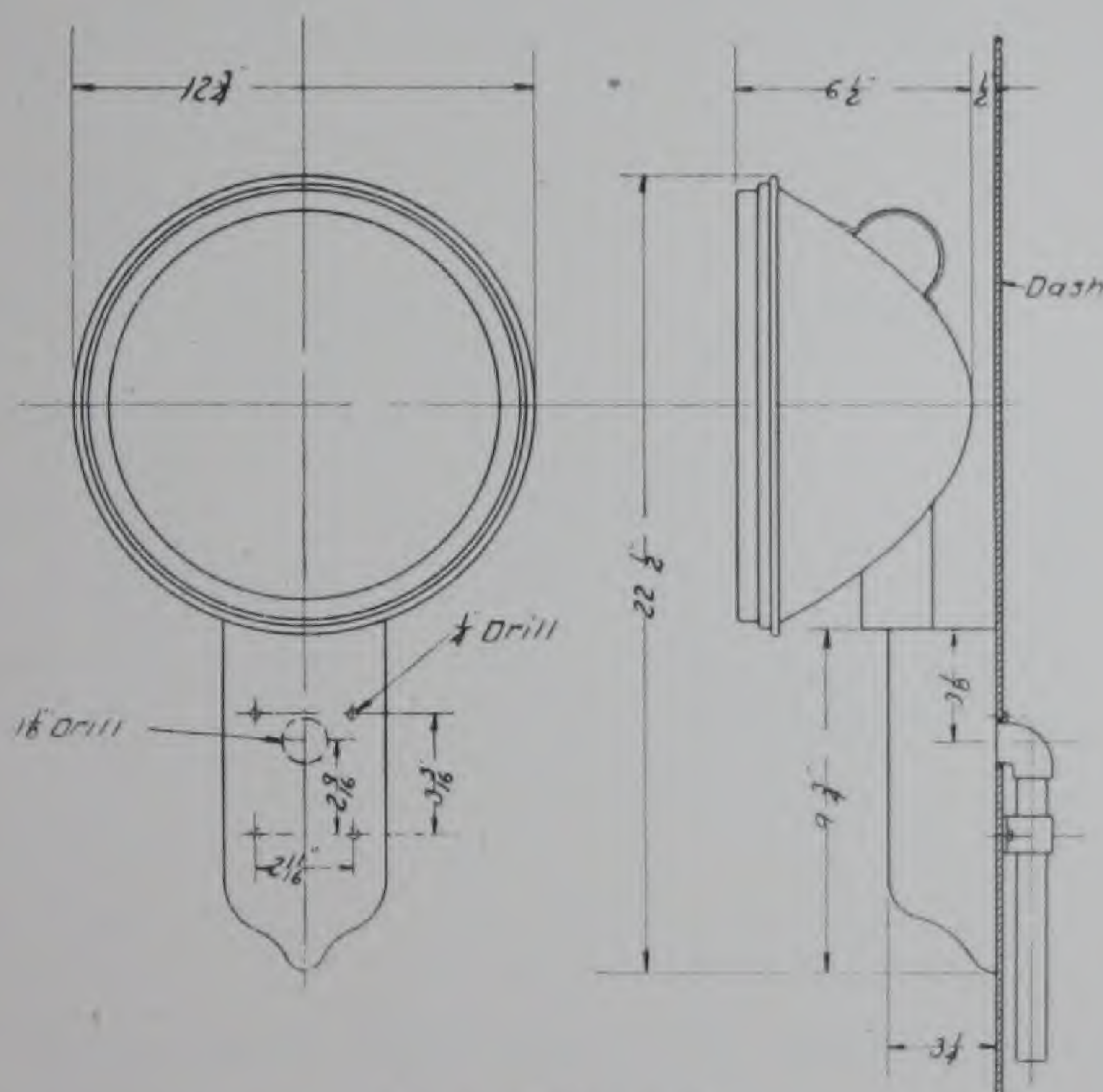
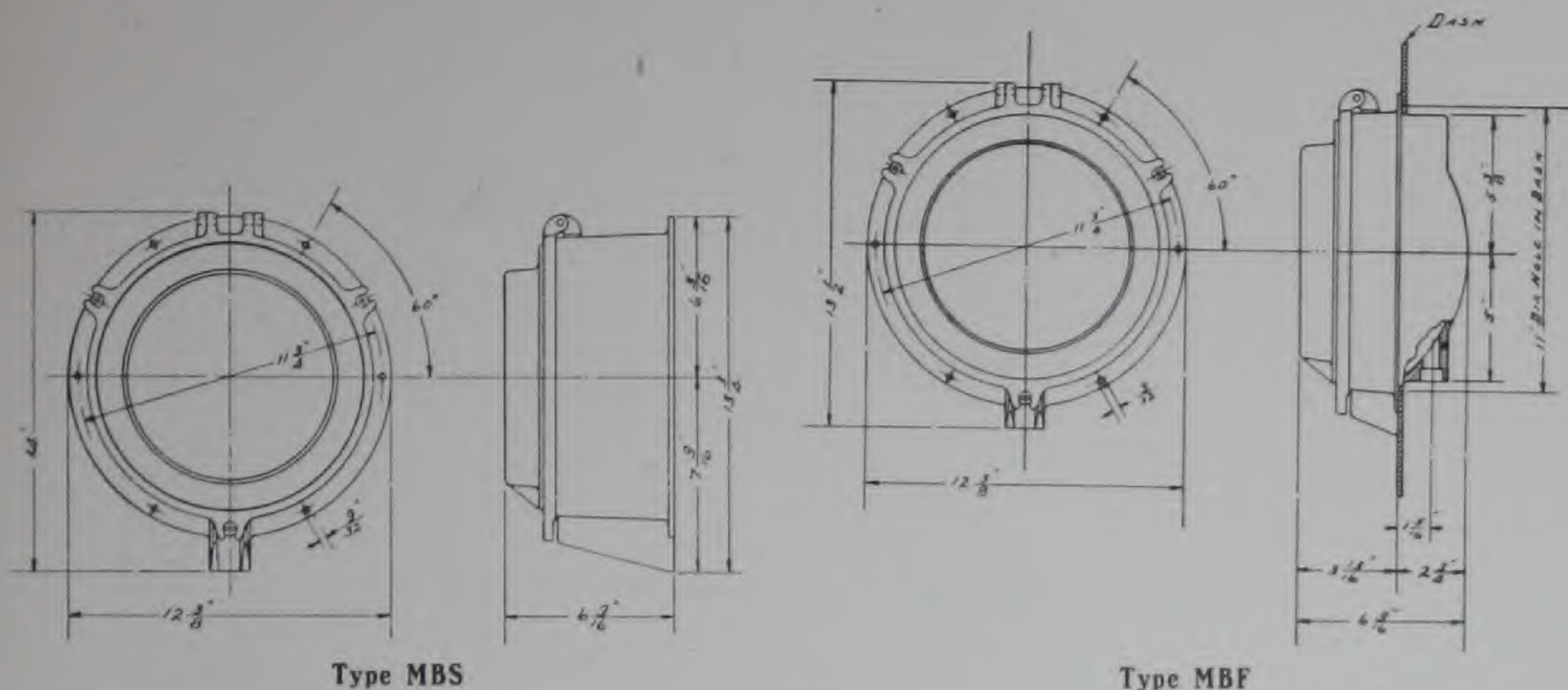


Type W				Types Z and ZW				
Clear Glass		Semp. Lens		Style of Door	Clear Glass		Semp. Lens	
Plain	Grid	Regular	Guard		Plain	Grid	Regular	Guard
4 ⁵ / ₁₆	4 ¹¹ / ₁₆	5 ¹⁵ / ₁₆	6 ¹ / ₄		Dim. A, in inches	2 ¹ / ₈	2 ¹ / ₂	3 ⁹ / ₁₆
				Dim. B, in inches	4 ¹ / ₂	4 ⁷ / ₈	3 ¹⁵ / ₁₆	6 ³ / ₁₆



Type ZB				Type ZP	
Clear Glass		Semp. Lens		Style of Door	Clear Glass
Plain	Grid	Regular	Guard		Semp. Lens
1 ⁹ / ₁₆	1 ¹⁵ / ₁₆	3 ¹³ / ₁₆	4 ¹ / ₁₆	Dim. A, in inches	2 ¹ / ₈
				Dim. B, in inches	4 ¹ / ₄
					Regular
					3 ⁷ / ₈
					6

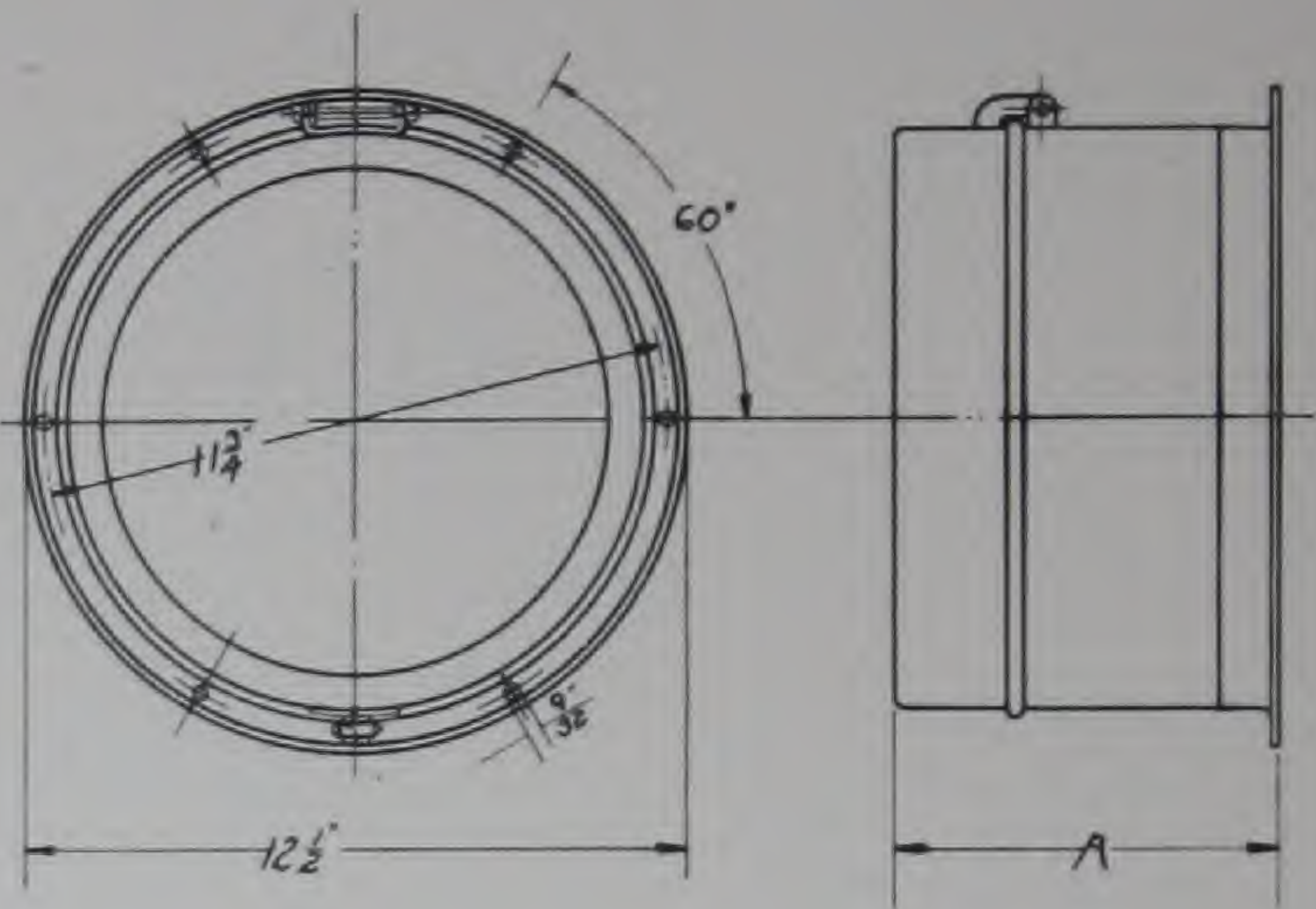
Dimension Drawings and Drilling Templates For Crouse-Hinds Imperial Incandescent Headlights



Syracuse Changeable

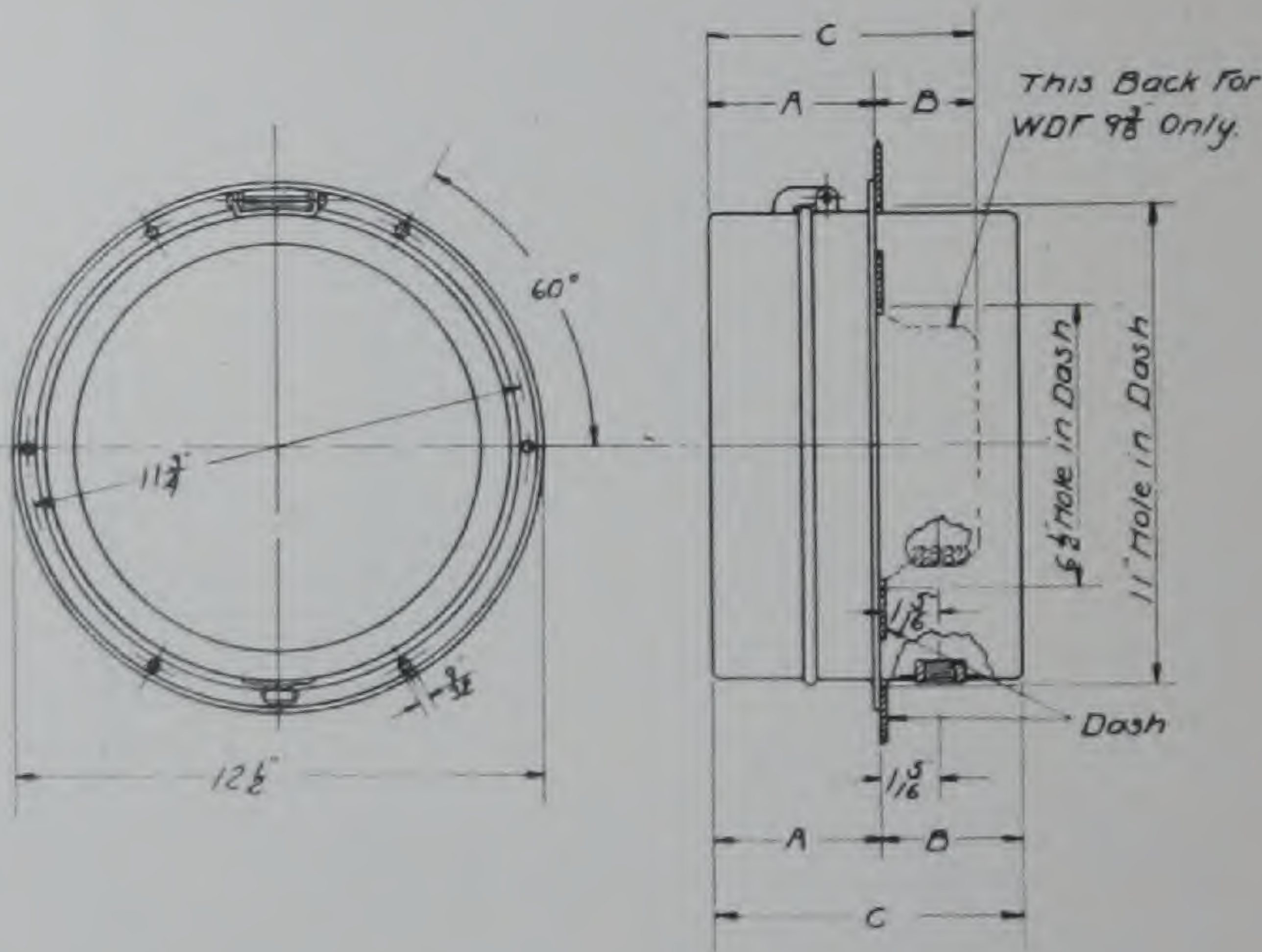
The above dimensional drawing for Syracuse Changeable headlight applies to Front, Side, and Combined Front and Side Contact types.

Dimension Drawings and Drilling Templates For Crouse-Hinds Imperial Incandescent Headlights



Types WBS, WCS and WDS—Pressed Steel

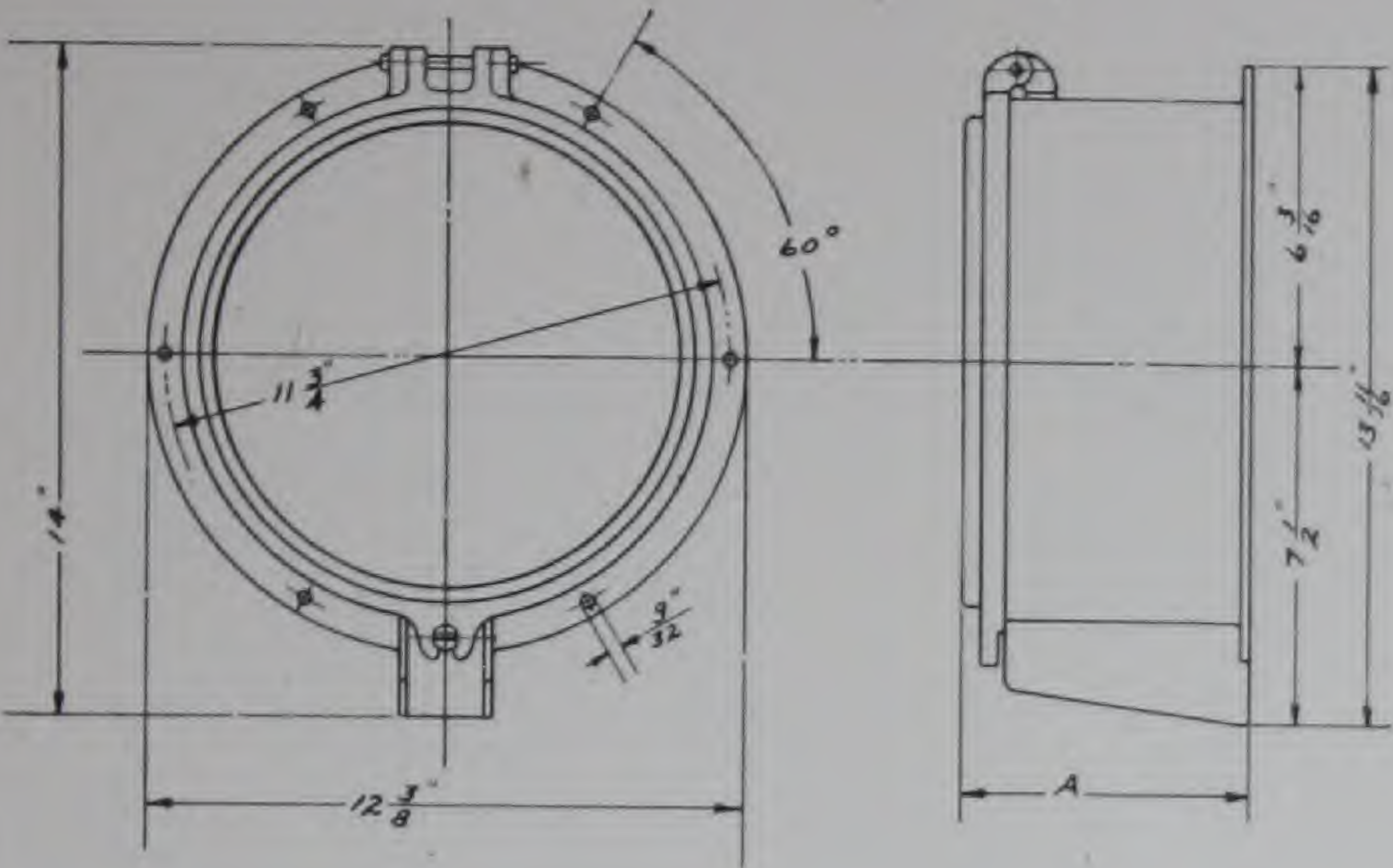
Type	WBS		WCS		WDS-9 5/8-Inch		WDS-9 3/8-Inch	
Style of Door . .	Plain	Grid	Plain	Grid	Plain	Grid	Plain	Grid
Dimension A, in inches	6 1/8	6 1/2	6 1/8	6 1/2	7 3/8	7 3/4	7	7 3/8



Types WBF, WCF and WDF—Pressed Steel

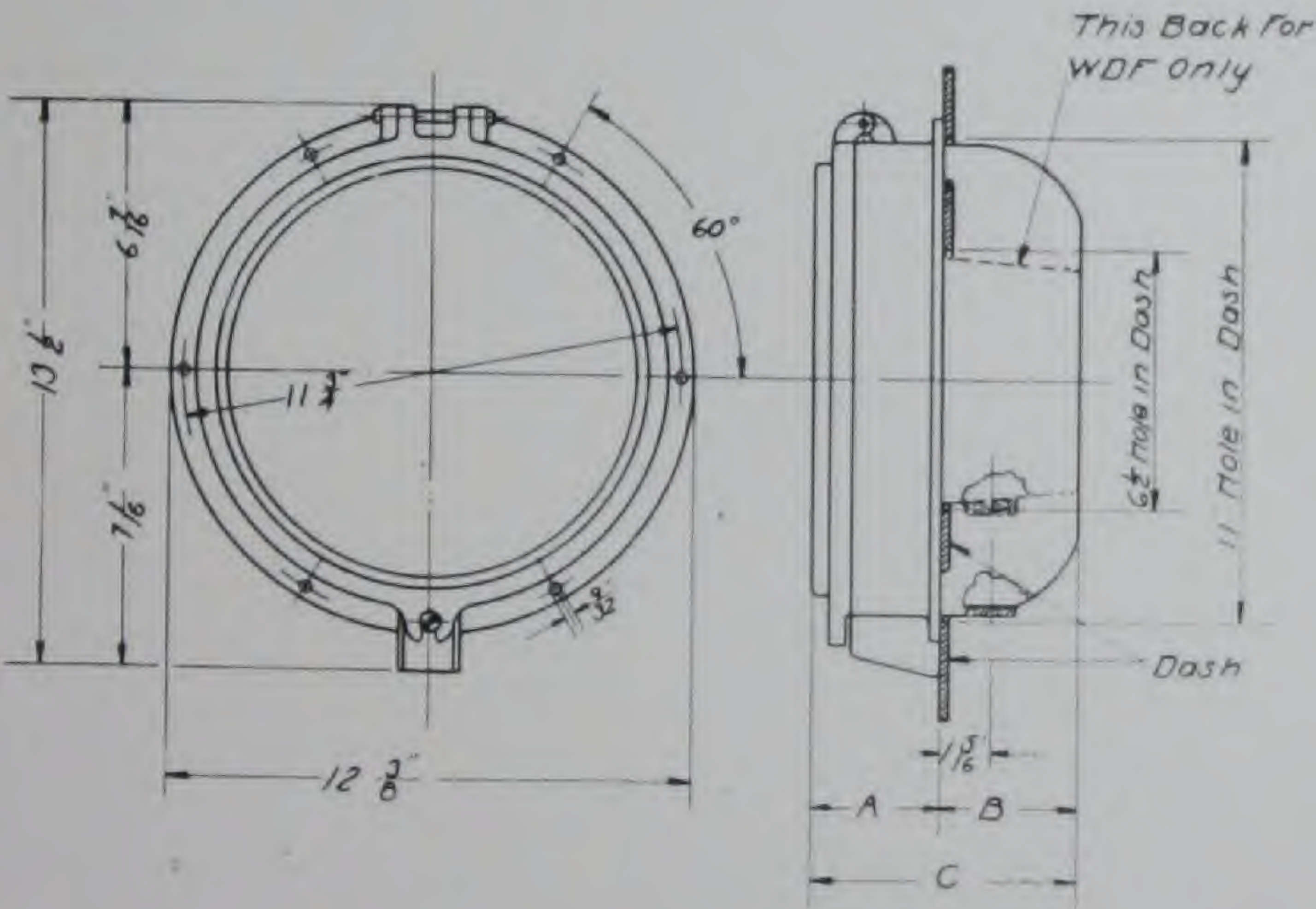
Type	WBF		WCF		WDF-9 5/8-Inch		WDF-9 3/8-Inch	
Style of Door . .	Plain	Grid	Plain	Grid	Plain	Grid	Plain	Grid
Dimension A, in inches	3 1/4	3 5/8	3 1/4	3 5/8	3 3/4	4 1/8	4 3/4	5 1/8
Dimension B, in inches	2 5/8	2 5/8	2 5/8	2 5/8	3 3/8	3 3/8	2 3/8	2 3/8
Dimension C, in inches	5 7/8	6 1/4	5 7/8	6 1/4	7 1/8	7 1/2	7 1/8	7 1/2

Dimension Drawings and Drilling Templates For Crouse-Hinds Imperial Incandescent Headlights



Types WBS, WCS and WDS—Cast Iron

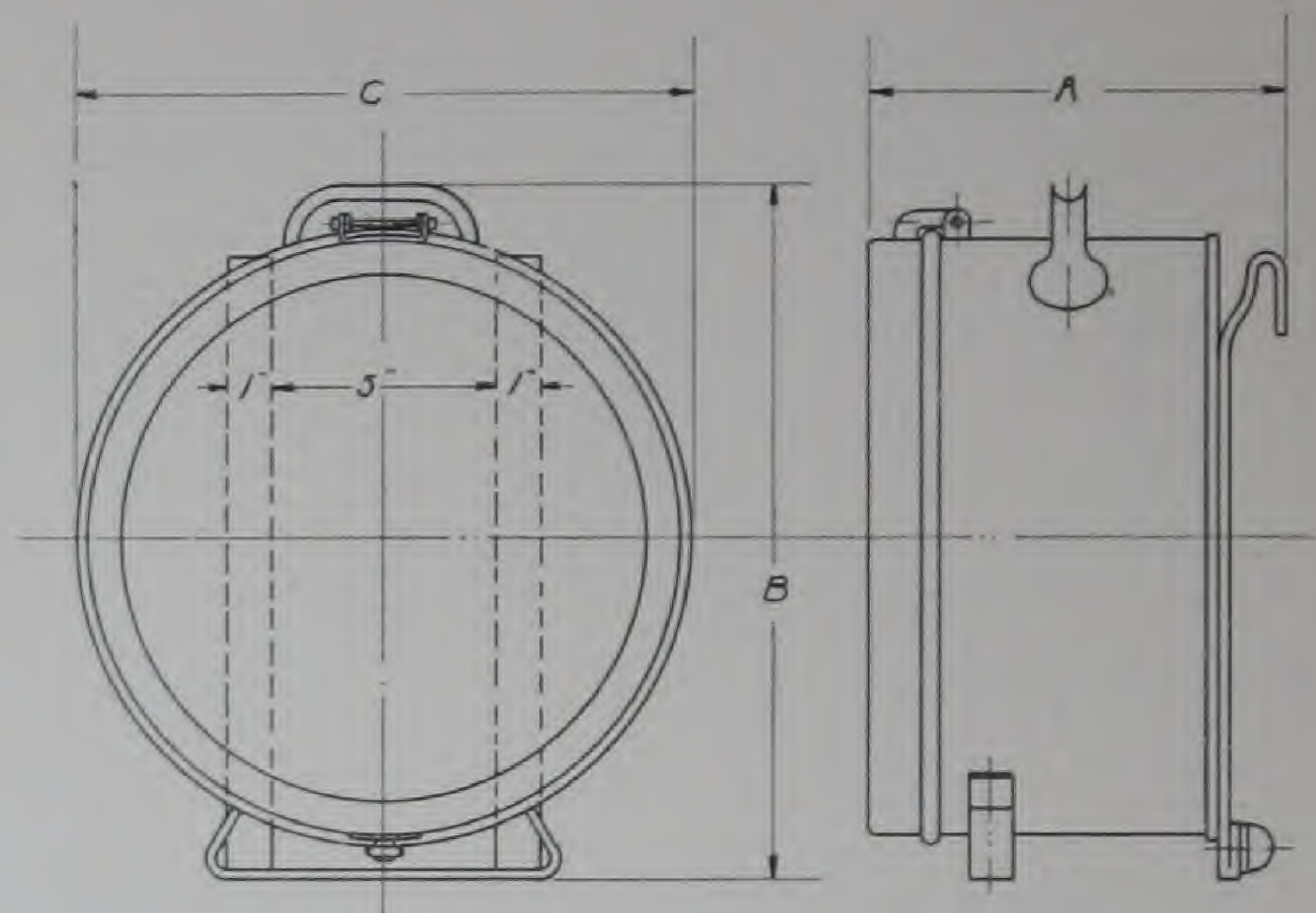
Type	WBS		WCS		WDS	
Style of Door	Plain	Grid	Plain	Grid	Plain	Grid
Dimension A, in inches. . .	7	6 1/2	6	5 1/2	8	7 1/2



Types WBF, WCF and WDF—Cast Iron

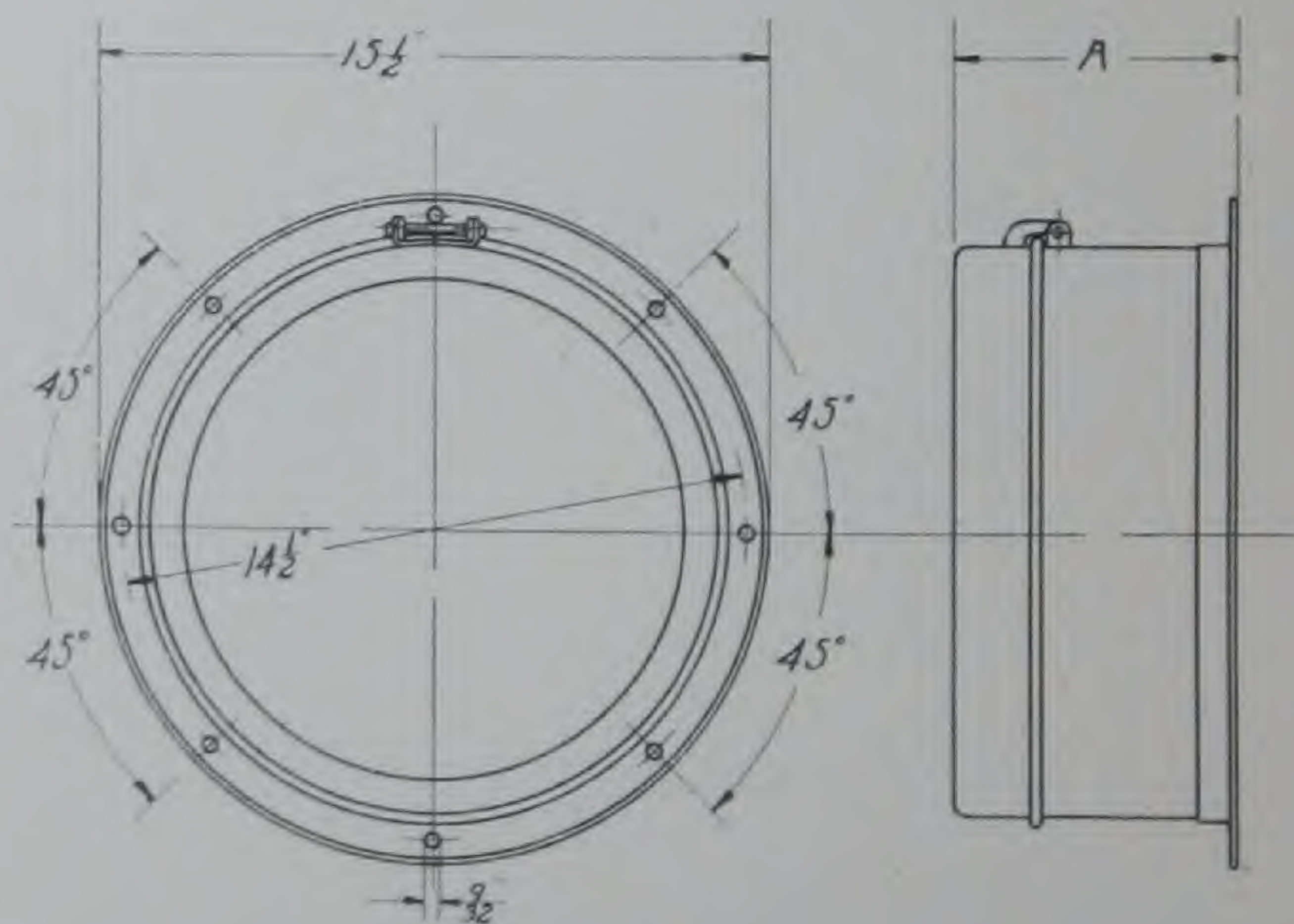
Type	WBF		WCF		WDF	
Style of Door	Plain	Grid	Plain	Grid	Plain	Grid
Dimension A, in inches. . .	3 7/8	3 1/4	3 7/8	3 1/4	4 7/8	4 3/8
Dimension B, in inches . .	3	3	2	2	3 1/8	3 1/8
Dimension C, in inches. . .	6 7/8	6 1/4	5 7/8	5 1/4	8	7 1/2

Dimension Drawings and Drilling Templates For Crouse-Hinds Imperial Incandescent Headlights



Types SAP, SCP and SDP—Portable

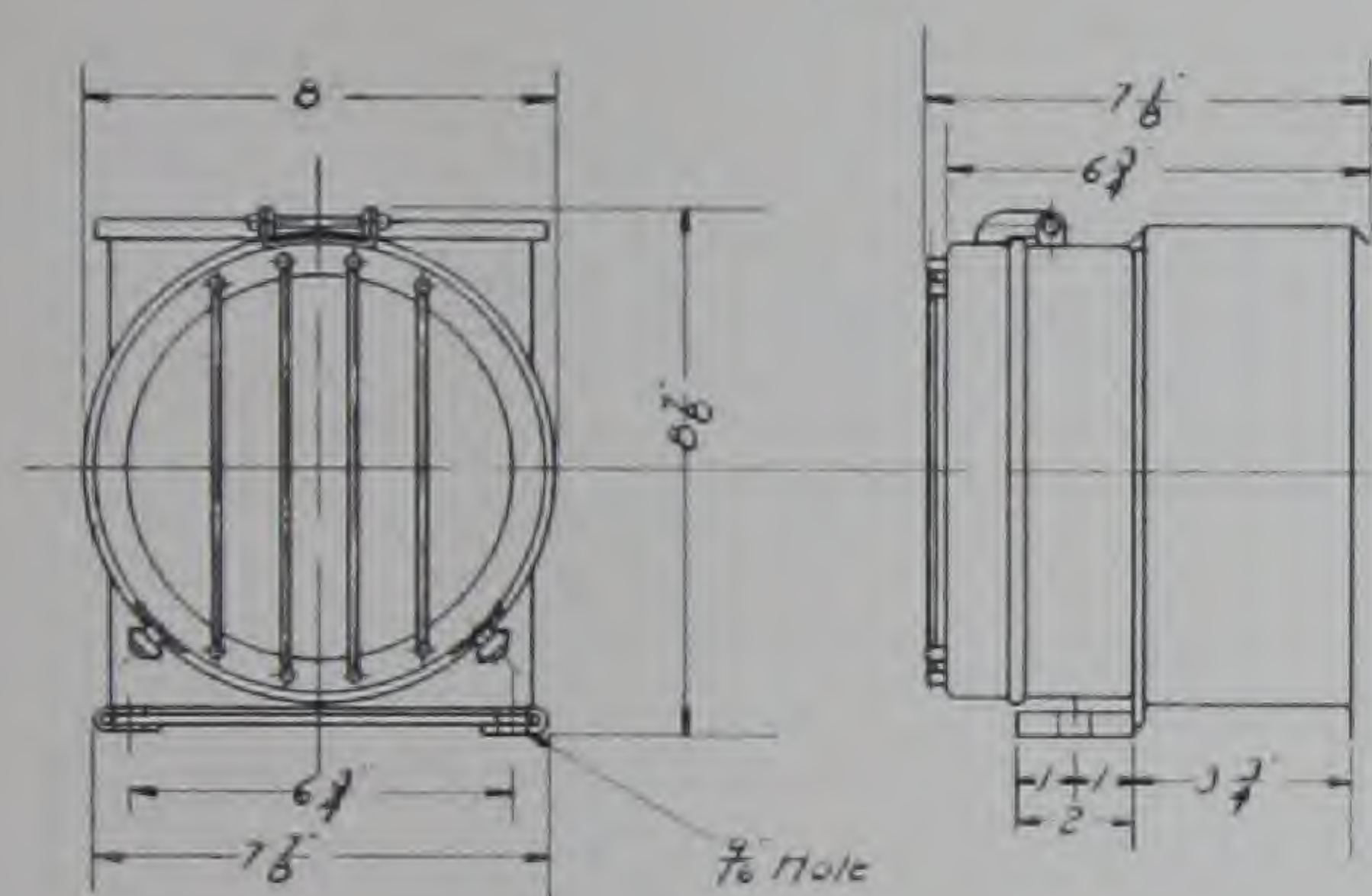
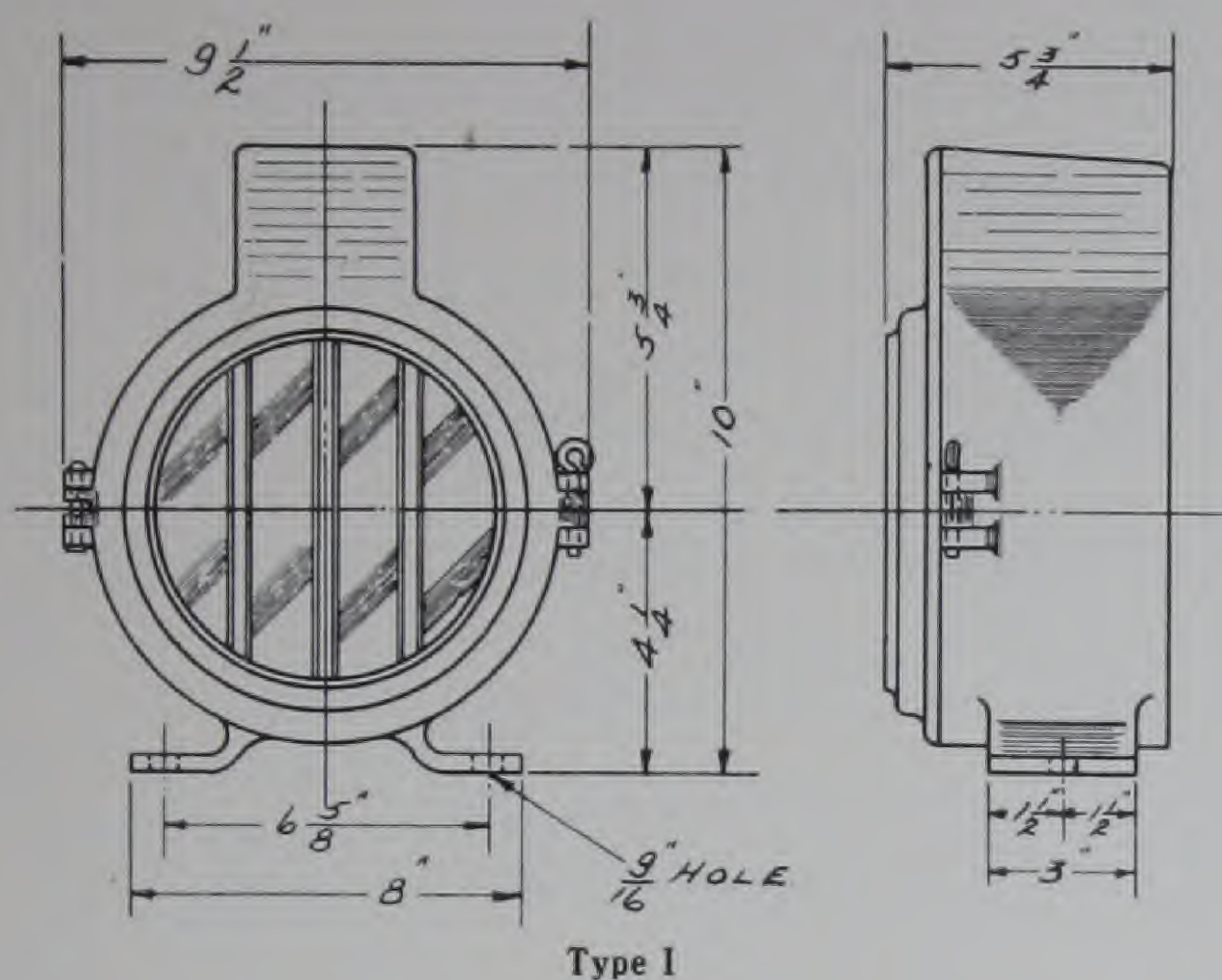
Type	SAP	SCP	SDP-12-Inch	SDP-16-Inch
Dimension A, in inches	7 ⁵ / ₈	7 ⁵ / ₈	9 ¹ / ₂	12
Dimension B, in inches	15 ¹ / ₄	15 ¹ / ₄	15 ¹ / ₄	20 ¹ / ₈
Dimension C, in inches	13 ³ / ₄	13 ³ / ₄	13 ³ / ₄	18



Types SAS, SCS and SDS—Stationary

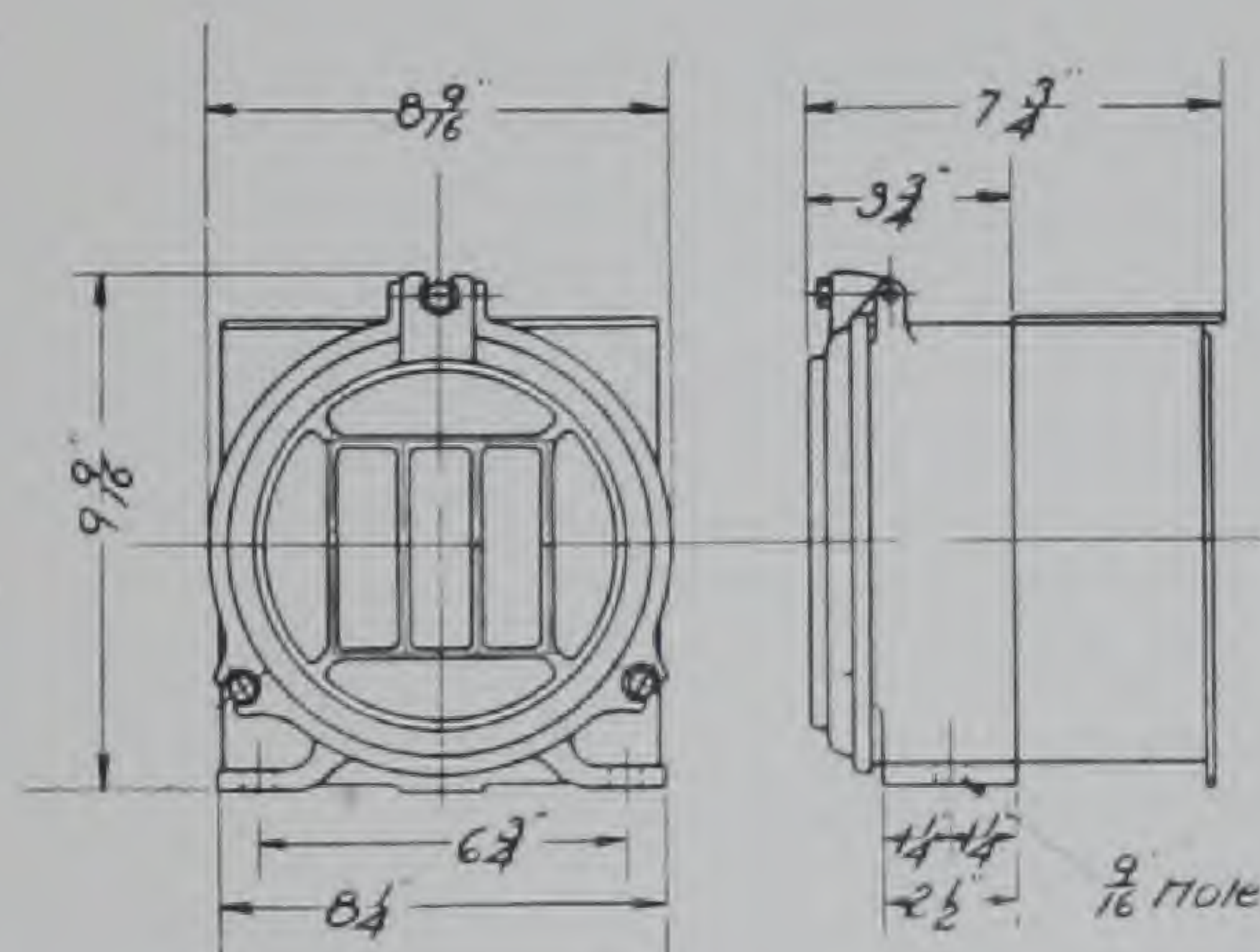
Type	SAS	SCS	SDS
Dimension A, in inches	6 ¹ / ₂	6 ¹ / ₂	8

Dimension Drawings and Drilling Templates For Crouse-Hinds Imperial Incandescent Headlights

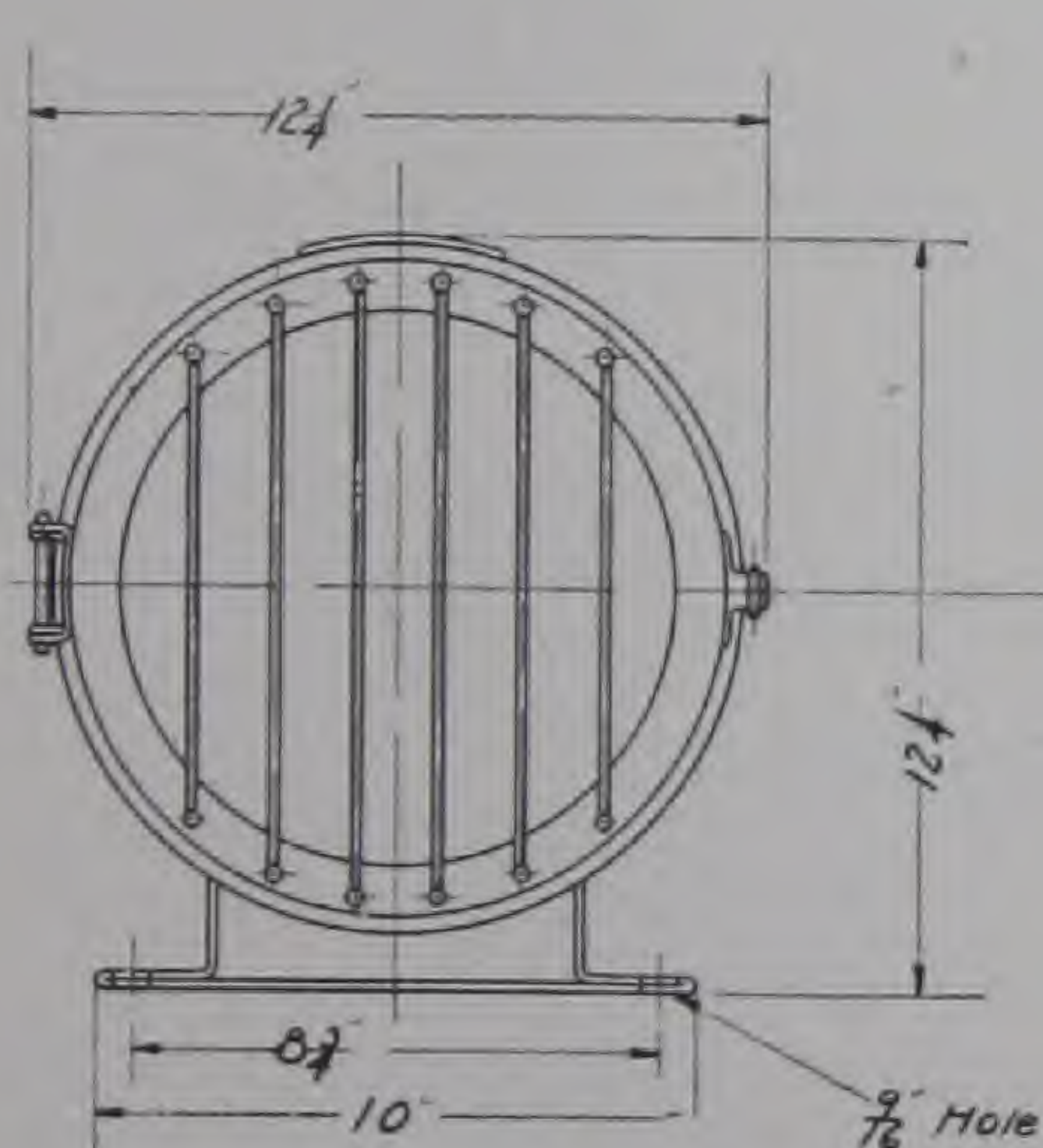


Pressed Steel

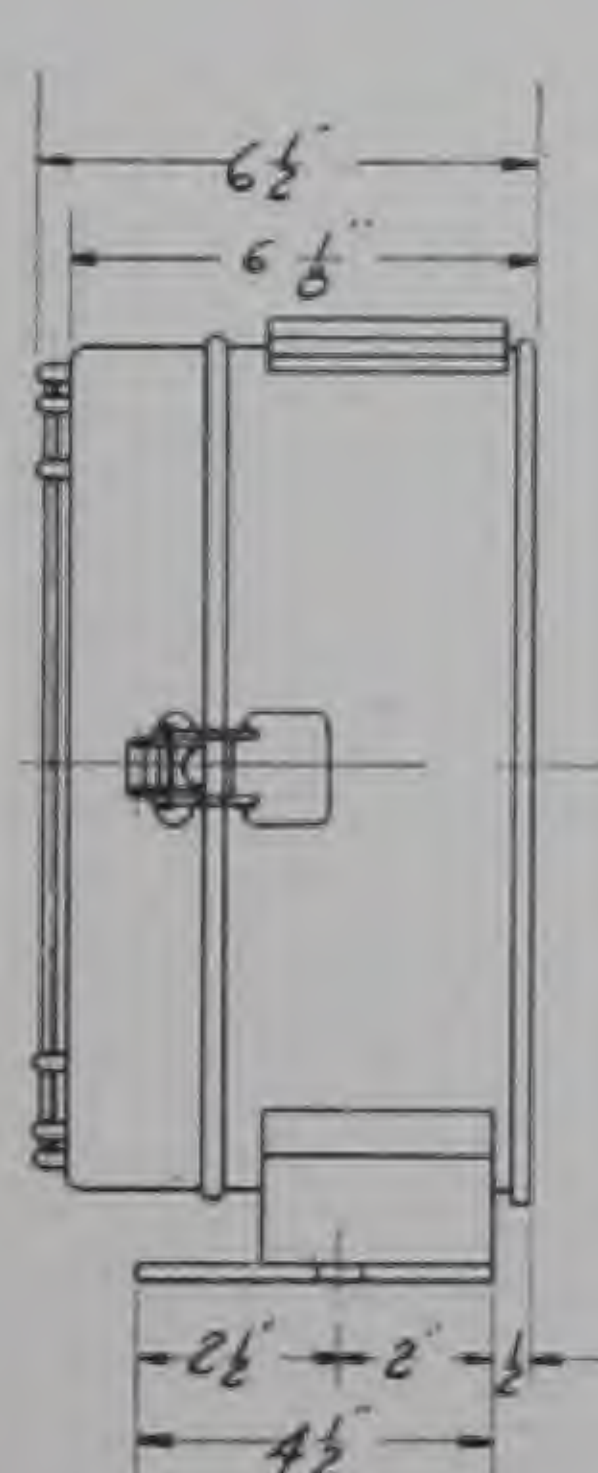
Type MD



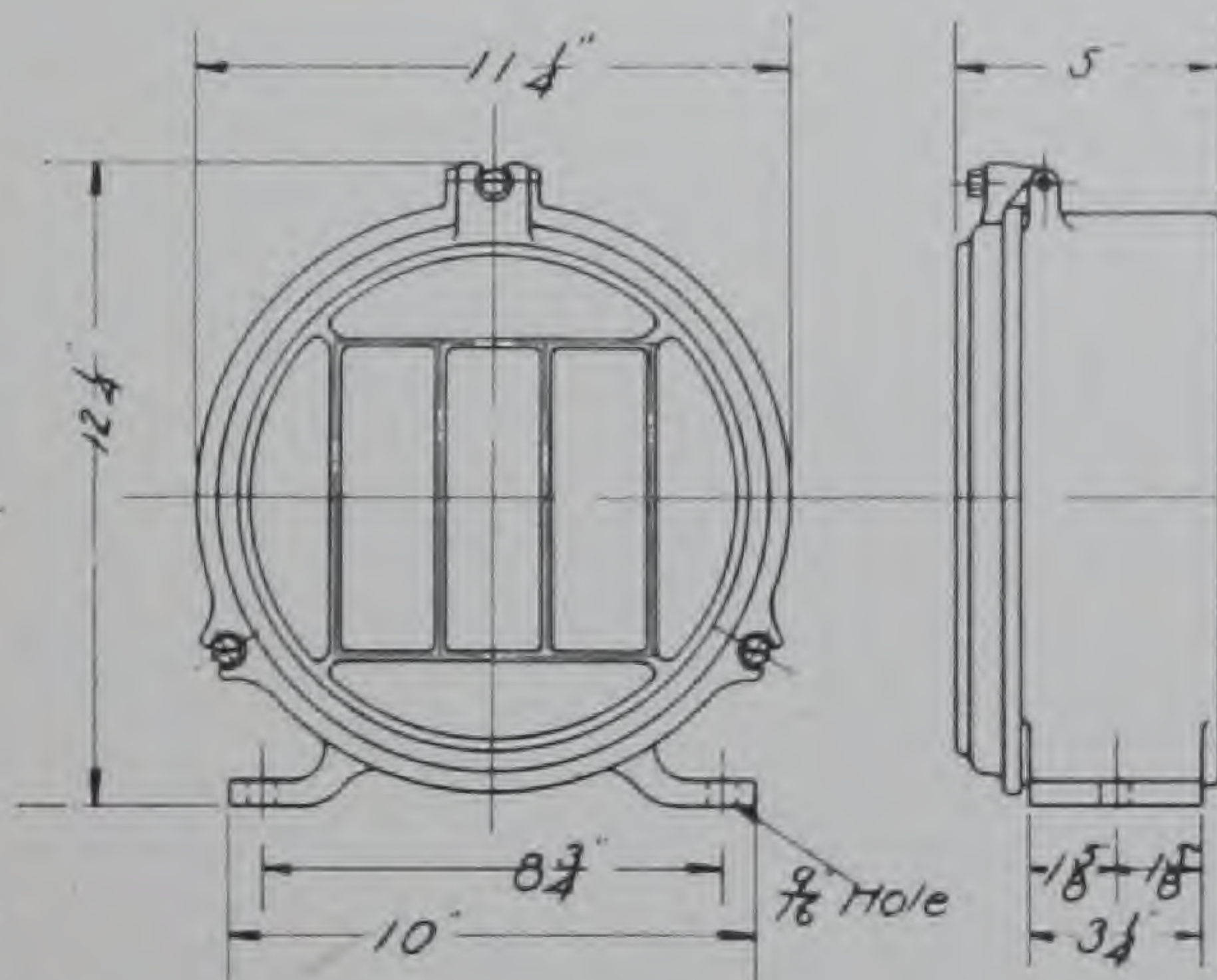
Cast Iron



Pressed Steel



Type MC



Cast Iron

Height of type MC headlight with turret base, 13 1/4 inches.

Listings of Headlight Parts Types W and Z

Type W Headlight—Assembled Parts

Description	Catalog Number	List Price Each
Case, with Lamp Receptacle on Bracket and Wired, (includes HL670, 3672)	HL3670	\$5.90
Lamp Receptacle on Bracket and Wired (includes HL672, 673, 674, 675)	HL3672	.85
Plain Rim Door with Fixtures, less Glass (includes HL682, 683, 684, 685, 686, 3680)	HL3686	2.00
Plain Rim Door with Glass, (includes HL687, 3686)	HL3687	2.20
Grid Frame Door with Fixtures, less Glass, (includes HL682, 683, 684, 685, 689, 3680)	HL3689	2.50
Grid Frame Door with Glass (includes HL687, 3689)	HL3690	2.70
Door with Fixtures, less Semaphore Lens, (includes HL683, 684, 685, 690, 691, 692, 5651)	HL3692	2.60
Door with Semaphore Lens, (includes HL693, 3692)	HL3693	5.15
Guard Door with Fixtures, less Lens, (includes HL683, 684, 685, 690, 691, 802, 5651)	HL4002	3.10
Guard Door with Semaphore Lens, (includes HL693, 4002)	HL4003	5.75

Type W Headlight—Detailed Parts

Case (Casting only)	HL670	\$3.70
Receptacle Bracket	HL672	.45
Lamp Receptacle	HL674	.45
Lead Wire for all types. (per foot)	HL675	.04
Screw with Nut for Receptacle (per dozen)	HL673	.75
Hinge Bolt with Nut.	HL678	.09
8 $\frac{3}{4}$ -Inch Aluminum Reflector	HL677	3.10
8 $\frac{3}{4}$ -Inch Enamel Reflector	HL801	3.10
Reflector Screw (per dozen)	HL827	.30
Frame for Plain Rim Door	HL686	1.10
Frame for Grid Door	HL689	1.55
Frame for Semaphore Door	HL692	1.35
Frame for Semaphore Guard Door	HL802	1.85
Double Thick Glass	HL687	.45
Plate Glass	HL688	1.30
8 $\frac{3}{8}$ -Inch Clear Semaphore Lens	HL693	2.60
8 $\frac{3}{8}$ -Inch "Noglare" Semaphore Lens.	HL5952	5.70
Rubber Packing for Double Thick Glass (per foot)	HL682	.15
Rubber Packing for Semaphore Lens (per foot)	HL5651	.15
Glass Holder Ring for Semaphore Door	HL690	.15
Door Catch (includes HL683, 684, 685)	HL4004	.45
Glass Holder Bracket (includes HL680, 681)	HL3680	.10
Shaft for Door Catch	HL683	.09
Coil Spring for Door Catch for all Types	HL684	.09
Thumb Wheel for Door Catch for all Types	HL685	.12
Bolt and Nut for Glass Holder Ring (HL690) (per dozen)	HL691	.50

Type Z Headlight—Assembled Parts

Case with Lamp Receptacle on Bracket and Wired, (includes HL803, 4009)	HL4007	\$4.90
Lamp Receptacle on Bracket and Wired, (includes HL673, 674, 675, 804)	HL4009	.85
Plain Door with Fixtures, less Glass, (includes HL684, 685, 808, 809, 4030, 3680)	HL4010	2.05
Plain Door with Glass (includes HL810, 4010)	HL4011	2.50
Grid Frame Door, with Fixtures, less Glass, (includes HL684, 685, 808, 812, 4030, 3680)	HL4013	2.50
Grid Frame Door, with Glass (includes HL810, 4013)	HL4014	2.95
Door with Fixtures, less Semaphore Lens, (includes HL684, 685, 808, 813, 814, 691, 5651)	HL4016	2.60
Door with Semaphore Lens (includes HL693, 4016)	HL4023	5.20
Guard Door with Fixtures, less Semaphore Lens, (includes HL684, 685, 808, 813, 815, 691, 5651)	HL4021	3.55
Guard Door with Semaphore Lens (includes HL693, 4021)	HL4024	6.15

Listings of Headlight Parts Types Z (Continued) and ZB

Type Z Headlight—Detailed Parts

Description	Catalog Number	List Price Each
Case (Casting only)	HL803	\$3.70
Receptacle Bracket	HL804	.45
Lamp Receptacle	HL674	.45
Screw with Nut for Lamp Receptacle (per dozen)	HL673	.75
Hinge Bolt and Nut	HL807	.09
9 $\frac{3}{4}$ -Inch Aluminum Reflector	HL805	3.05
9 $\frac{3}{4}$ -Inch Enamel Reflector	HL806	3.05
Reflector Center Screws (per dozen)	HL676	.30
Reflector Rim Screws (per dozen)	HL827	.30
Frame for Plain Rim Door	HL809	1.10
Frame for Grid Door	HL812	1.55
Frame for Semaphore Door	HL814	1.35
Frame for Semaphore Guard Door	HL815	1.85
Double Thick Glass	HL810	.45
Plate Glass	HL811	1.30
8 $\frac{3}{8}$ -Inch Clear Glass Semaphore Lens	HL693	2.60
8 $\frac{3}{8}$ -Inch "Noglare" Semaphore Lens	HL5952	5.70
Rubber Packing for Double Thick Glass (per foot)	HL4030	.15
Rubber Packing for Semaphore Lens (per foot)	HL5651	.15
Glass Holder Ring	HL813	.45
Door Catch (includes HL684, 685, 808)	HL4022	.60
Glass Holder Bracket (includes HL680, 681)	HL3680	.10
Lead Wire (per foot)	HL675	.04
Coil Spring for Door Catch	HL684	.09
Thumb Wheel for Door Catch	HL685	.12
Shaft for Door Catch	HL808	.09
Bolt and Nut for Glass Holder Ring (per dozen)	HL691	.50

Type ZB Headlight—Assembled Parts

Case with Lamp Receptacle on Bracket and Wired (includes HL816, 4009)	HL4026	\$4.30
Lamp Receptacle on Bracket and Wired (includes HL673, 674, 675, 804)	HL4009	.85
Plain Rim Door with Fixtures, less Glass, (includes HL684, 685, 808, 818, 682, 3680)	HL4028	2.00
Plain Rim Door with Glass (includes HL687, 4028)	HL4029	2.20
Grid Frame Door with Fixtures, less Glass, (includes HL684, 685, 808, 819, 682, 3680)	HL4031	2.50
Grid Frame Door with Glass (includes HL687, 4031)	HL4032	2.70
Door with Fixtures, less Semaphore Lens, (includes HL684, 685, 808, 821, 4017, 5651)	HL4034	2.60
Door with Semaphore Lens (includes HL693, 4034)	HL4018	5.55
Guard Door with Fixtures, less Semaphore Lens, (includes HL684, 685, 808, 820, 822, 4017, 5651)	HL4039	3.55
Guard Door with Lens (includes HL693, 4039)	HL4019	6.00

Type ZB Headlight—Detailed Parts

Case (Casting only)	HL816	\$2.80
Receptacle Bracket	HL804	.45
Lamp Receptacle	HL674	.45
Lead Wires (per foot)	HL675	.04
Screw with Nut for Lamp Receptacle (per dozen)	HL673	.75
Hinge Bolt with Nut	HL807	.09
8 $\frac{3}{4}$ -Inch Aluminum Reflector	HL677	3.10
8 $\frac{3}{4}$ -Inch Enamel Reflector	HL801	3.10
Reflector Center Screws (per dozen)	HL676	.30
Reflector Rim Screws (per dozen)	HL827	.30
Clamping Ring	HL817	1.25
Frame for Plain Rim Door	HL818	1.10
Frame for Grid Door	HL819	1.55
Frame for Semaphore Door	HL821	1.35
Frame for Semaphore Guard Door	HL822	1.80
Double Thick Glass	HL687	.45

Listings of Headlight Parts

Types ZB (Continued), ZP and ZW

Type ZB Headlights—Detailed Parts—Continued

Description	Catalog Number	List Price Each
Plate Glass	HL688	\$1.30
8 $\frac{3}{8}$ -Inch Clear Semaphore Lens	HL693	2.60
8 $\frac{3}{8}$ -Inch "Noglare" Semaphore Lens	HL5952	5.70
Rubber Packing for Double Thick Glass (per foot)	HL682	.15
Rubber Packing for Semaphore Lens (per foot)	HL5651	.15
Glass Holder Ring for Semaphore Lens	HL4017	.45
Screw with Nut for Glass Holder Ring (per dozen)	HL820	.50
Door Catch (includes HL684, 685, 808)	HL4022	.60
Glass Holder Bracket (includes HL680, 681)	HL3680	.10
Coil Spring for Door Catch	HL684	.09
Thumb Wheel for Door Catch	HL685	.12
Shaft for Door Catch	HL808	.09

Type ZP Headlight—Assembled Parts

Case, with Lamp Receptacle on Bracket and Wired (includes HL5871, 5276)	HL5850	\$6.70
Lamp Receptacle on Bracket and Wired (includes HL673, 674, 675, 5275)	HL5276	.85
Door with Fixtures, less Glass or Lens, (includes HL5870, 5277, 5849, 5651)	HL5852	2.05
Plain Rim Door with Glass (includes HL5278, 5852)	HL5853	2.50
Plain Rim Door with Semaphore Lens (includes HL693, 5852)	HL5271	4.90

Type ZP Headlight—Detailed Parts

Case only (Pressed Steel)	HL5871	\$1.80
Door Frame only	HL5870	1.25
Lamp Receptacle Bracket	HL5275	.45
Lamp Receptacle	HL674	.45
Screw with Nut for Lamp Receptacle (per dozen)	HL673	.75
Lead Wires (per foot)	HL675	.04
Hinge Bolt with Nut	HL5854	.40
Screw with Nut for Glass Holder Ring (per dozen)	HL5849	.60
9 $\frac{1}{2}$ -Inch Aluminum Reflector with Metal Form	HL5273	3.10
9 $\frac{1}{2}$ -Inch White Enamel Steel Reflector	HL5274	3.10
Reflector Screw (per dozen)	HL827	.30
Plain Double Thick Glass	HL5278	.45
Plain Plate Glass	HL5279	1.30
"Noglare" Glass	HL5915	3.75
Clear Semaphore Lens	HL693	2.60
"Noglare" Semaphore Lens	HL5952	5.70
Rubber Packing for Glass (per foot)	HL5651	.15
Glass Holder Ring for Doors	HL5277	.45
Swivel Locking Bolt with Yoke	HL5863	1.50
Socket Wrench for Lock Bolt	HL5281	.25

A socket wrench will be furnished free with each order for ten or less headlights equipped with locking device. On orders for more than ten headlights so equipped, a wrench will be furnished free with each ten headlights.

Type ZW Headlight—Assembled Parts

Case with Lamp Receptacle on Bracket and Wired (includes HL4056, 4009)	HL4051	\$6.50
Lamp Receptacle on Bracket and Wired (includes HL673, 674, 675, 804)	HL4009	.85
Plain Rim Door with Fixtures, less Glass, (includes HL3680, 4067, 4072)	HL4069	2.25
Plain Rim Door with Glass (includes HL4059, 4069)	HL4070	2.70
Grid Frame Door with Fixtures, less Glass, (includes HL3680, 4061, 4067)	HL4053	2.65
Grid Frame Door with Glass (includes HL4053, 4059)	HL4054	3.10
Semaphore Door with Fixtures, less Semaphore Lens, (includes HL691, 4062, 5651, 4068)	HL4055	2.80
Semaphore Door with Semaphore Lens (includes HL693, 4055)	HL4035	5.40
Guard Door with Fixtures, less Semaphore Lens, (includes HL691, 4073, 4068, 5651)	HL4071	3.70
Guard Door with Semaphore Lens (includes HL693, 4071)	HL4036	6.30

Listings of Headlight Parts **Types ZW (Continued) and Syracuse Changeable**

Type ZW Headlight—Detailed Parts

Description	Catalog Number	List Price Each
Case (Casting only)	HL4056	\$4.20
Receptacle Bracket	HL804	.45
Lamp Receptacle	HL674	.45
Lead Wires	HL675	.04
Screw with Nut for Lamp Receptacle	HL673	.75
Hinge Bolt and Nut	HL807	.09
9 $\frac{3}{4}$ -Inch Aluminum Reflector	HL805	3.05
9 $\frac{3}{4}$ -Inch Enamel Reflector	HL806	3.05
Reflector Center Screws	HL676	.30
Reflector Rim Screws	HL827	.30
Frame for Plain Rim Door	HL4072	1.10
Frame for Grid Door	HL4061	1.55
Frame for Semaphore Door	HL4062	1.35
Frame for Semaphore Guard Door	HL4073	1.85
Double Thick Glass	HL4059	.45
"Noglare" Glass	HL4060	3.75
Rubber Packing for Double Thick Glass	HL4067	.15
Rubber Packing for Semaphore Lens	HL5651	.15
Bolt and Nut for Glass Holder Ring	HL691	.50
8 $\frac{3}{8}$ -Inch Clear Semaphore Lens	HL693	2.60
8 $\frac{3}{8}$ -Inch "Noglare" Semaphore Lens	HL5952	5.70
Glass Holder Ring for Semaphore Door	HL4068	.45
Swivel Locking Bolt with Swivel, Lock Nut and Cotter Pin	HL4063	1.50
Glass Holder Bracket (includes HL680, 681)	HL3680	.10

Syracuse Changeable Headlights, Front Contact—Assembled Parts

Stem with Lamp Receptacle, Edison Base	HL3414	\$1.80
Complete Mechanism, less Receptacle	HL3431	2.30
Contact Bridge	HL3432	.75
Long Finger Spring, Bridge and Contact	HL3433	.85
Short Finger Spring and Angle Plate	HL3434	.60
Set of Contact Clips, Mounted on Slate, (includes HL437, 438, 439, 440, 441, 3432, 3433, 3434)	HL3440	1.95
Stationary Receptacle, less Mechanism	HL3460	1.25

Syracuse Changeable Headlights, Combined Front and Side Contact—Assembled Parts

Stem with Lamp Receptacle, Edison Base	HL3425	\$1.80
Long Finger Spring, Bridge and Contact Plate	HL3433	.85
Short Finger Spring, and Angle Plate	HL3434	.60
Stationary Receptacle, less Mechanism	HL3460	1.25
Complete Mechanism, less Receptacle	HL3480	2.90
Contact Bridge	HL3481	.75
Auxiliary Contact	HL3482	.60
Set of Contact Clips Mounted on Slate (includes HL437, 438, 439, 440, 441, 483, 3433, 3434, 3481, 3482)	HL3483	2.45

Syracuse Changeable Headlights—Detailed Parts

Removable Headlight, less Stem, for both Styles	HL3400	\$7.30
Removable Headlight, less Stem and Door, for both Styles	HL3403	5.50
Complete Door, for both Styles of Headlight	HL3409	3.90
Complete Door, less Glass, for both Styles of Headlight	HL3410	3.65
Glass Holder Bracket, for Door HL3409	HL3411	.18
Tin Cap, for Stems HL3414, 3425	HL5900	.15
Contact Plates (new style), for Stems HL3414, 3425	HL418	.10
Contact Plates (old style), for Stem HL3425	HL5901	.10
Handle, for Headlight HL3400	HL404	.18
Catch, for Headlight HL3400	HL405	.36
Hood, for Catch HL405	HL406	.18
Hinge, for Door HL3409	HL408	.45
Clear Glass, for Door HL3409	HL409	.45
"Noglare" Glass, for Door HL3409	HL5918	3.75
Porcelain Lamp Receptacle, Edison Base, for both Styles of Headlight	HL414	.45

Listings of Headlight Parts

Syracuse Changeable (Continued) and Types WDS, WDF, WBS, WBF, WCS and WCF—Pressed Steel

Syracuse Changeable Headlights—Detailed Parts—Continued

Description	Catalog Number	List Price Each
Lead Wires, for Mechanisms HL3431, 3480 (per foot)	HL430	\$.04
1/2-Inch Fastening Screw, for Mechanisms HL3431, 3480 (per dozen)	HL437	.30
5/8-Inch Fastening Screw, for Mechanisms HL3441, 3480 (per dozen)	HL438	.30
Slate Base, for Mechanism HL3431	HL440	.45
Wooden Base, for Mechanism HL3431	HL444	.18
Weather-proof Backing, for HL3431, 3446, 3480	HL445	.12
Lid for Receptacle, for HL3460 (per dozen)	HL461	.45
Conduit, for Lead Wire HL430	HL464	.45
Clamp, for Conduit HL464	HL465	.18
Slate Base, for Mechanism HL3480	HL483	.45
Wooden Base, for Mechanism HL3480	HL484	.18
Short Stove Bolt, for Mechanism HL3480 (per dozen)	HL489	.36

Screws and Nuts for Syracuse Changeable Headlights

Fastening Screw, for HL414 (per dozen)	HL415	\$.30
Wire Nuts, for Mechanisms HL3431, 3480	HL441	.12
Fastening Screw, for Receptacle HL3460	HL463	.30
Fastening Stud and Nuts, for Mechanisms HL3480, 3431	HL487	.18
Extra Nuts, for Stud HL487 (per dozen)	HL488	.30

Types WDS, WDF, WBS, WBF, WCS and WCF—Pressed Steel Headlights Assembled and Detailed Parts

Pressed Steel Case for 9 5/8" Reflector, (includes HL6018, 6048 and necessary Screws and Nuts), for Type WDS Headlight	HL6000	\$4.15
Pressed Steel Case for 9 3/8" Reflector, (includes HL6018, 6048 and necessary Screws and Nuts), for Type WDS Headlight	HL6001	4.15
Pressed Steel Case for 9 5/8" Reflector, (includes HL6018, 6048 and necessary Screws and Nuts), for Type WDF Headlight	HL6002	4.15
Pressed Steel Case for 9 3/8" Reflector, (includes HL6018, 6048 and necessary Screws and Nuts), for Type WDF Headlight	HL6003	4.15
Pressed Steel Case, (includes HL6018, 6048 and necessary Screws and Nuts), for Type WBS Headlight	HL6004	4.15
Pressed Steel Case, (includes HL6018, 6048 and necessary Screws and Nuts), for Type WBF Headlight	HL6005	4.15
Pressed Steel Case, (includes HL6018, 6048 and necessary Screws and Nuts), for Type WCS Headlight	HL6006	4.15
Pressed Steel Case, (includes HL6018, 6048 and necessary Screws and Nuts), for Type WCF Headlight	HL6007	4.15
Receptacle Support complete, (includes Yokes, Bushings, Washers, Springs and necessary Screws), for Types WDS and WDF Headlights	HL6008	1.80
Receptacle Support complete, (includes Yokes, Bushings, Washers, Springs and necessary Screws), for Types WBS and WBF Headlights	HL6009	1.80
Receptacle Support and Set Screw, for Types WCS and WCF Headlights	HL6010	1.25
Receptacle Bracket, (includes Studs and Nuts), for Types WDS and WDF Headlights	HL6011	1.00
Receptacle Bracket, (includes Studs, Nuts and Adjusting Screws), for Types WBS and WBF Headlights	HL6012	1.50
Receptacle Bracket, (includes Studs and Nuts), for Types WCS and WCF Headlights	HL6013	.75
Plain Rim Door with Fixtures, (includes HL6020, 6024, 6044 and Screws), for Types WDS and WDF Headlights with 9 5/8" Reflector and for Types WBS, WBF, WCS and WCF Headlights	HL6014	3.35
Plain Rim Door with Fixtures, (includes HL6021, 6025, 6045 and Screws), for Types WDS and WDF Headlights with 9 3/8" Reflector	HL6015	3.35
Grid Door with Fixtures, (includes HL6022, 6024, 6044 and Screws), for Types WDS and WDF Headlights with 9 5/8" Reflector and for Types WBS, WBF, WCS and WCF Headlights	HL6016	4.60
Grid Door with Fixtures, (includes HL6023, 6025, 6045 and Screws), for Types WDS and WDF Headlights with 9 3/8" Reflector	HL6017	4.60
Locking Device with Pin for Doors, for Types WDS, WDF, WBS, WBF, WCS and WCF Headlights	HL6018	.35

Listings of Headlight Parts

Types WDS, WDF, WBS, WBF, WCS, WCF—Pressed Steel (Continued)

Assembled and Detailed Parts

Description	Catalog Number	List Price Each
Lamp Receptacle, for Types WDS and WDF Headlights	HL6019	\$.45
Lamp Receptacle, for Types WBS, WBF, WCS and WCF Headlights	HL674	.45
Frame for Plain Door, for Types WBS, WBF, WCS and WCF Headlights	HL6020	2.25
Frame for Plain Door, for Types WDS and WDF Headlights	HL6093	2.25
Frame for Plain Door, for Types WDS and WDF Headlights with 9 $\frac{3}{8}$ " Reflector	HL6021	2.25
Frame for Grid Door, for Types WDS and WDF Headlights	HL6094	3.50
Frame for Grid Door, for Types WBS, WBF, WCS and WCF Headlights	HL6022	3.50
Frame for Grid Door, for Types WDS and WDF Headlights with 9 $\frac{3}{8}$ " Reflector	HL6023	3.50
Clear Glass, Double Thick, for Types WDS and WDF Headlights with 9 $\frac{5}{8}$ " Reflector and Types WBS, WBF, WCS and WCF Headlights	HL6024	.50
Clear Glass, Double Thick, for Types WDS and WDF Headlights with 9 $\frac{3}{8}$ " Reflector	HL6025	.50
Glass, "Noglare," for Door, for Types WDS and WDF Headlights with 9 $\frac{5}{8}$ " Reflector and Types WBS, WBF, WCS and WCF Headlights	HL6026	3.75
Glass, "Noglare," for Door, for Types WDS and WDF Headlights with 9 $\frac{3}{8}$ " Reflector	HL6027	3.75
9 $\frac{5}{8}$ " Reflector, Gold Glass, for Types WDS and WDF Headlights	HL6028	5.75
9 $\frac{3}{8}$ " Reflector, Gold Glass, for Types WDS and WDF Headlights	HL6029	5.75
Reflector, Gold Glass, for Types WBS and WBF Headlights	HL6030	5.75
Reflector, Gold Glass, for Types WCS and WCF Headlights	HL6031	5.75
9 $\frac{5}{8}$ " Reflector, Crystal Glass, for Types WDS and WDF Headlights	HL6032	5.75
9 $\frac{3}{8}$ " Reflector, Crystal Glass, for Types WDS and WDF Headlights	HL6033	5.75
Reflector, Crystal Glass, for Types WBS and WBF Headlights	HL6034	5.75
Reflector, Crystal Glass, for Types WCS and WCF Headlights	HL6035	5.75
9 $\frac{5}{8}$ " Reflector, Aluminum, for Types WDS and WDF Headlights	HL6036	4.25
9 $\frac{3}{8}$ " Reflector, Aluminum, for Types WDS and WDF Headlights	HL6037	4.25
Reflector, Aluminum, for Types WBS and WBF Headlights	HL6038	4.25
Reflector, Aluminum, for Types WCS and WCF Headlights	HL6039	4.25
9 $\frac{5}{8}$ " Reflector, Nickel-plated Copper, for Types WDS and WDF Headlights	HL6040	4.75
9 $\frac{3}{8}$ " Reflector, Nickel-plated Copper, for Types WDS and WDF Headlights	HL6041	4.75
Reflector, Nickel-plated Copper, for Types WBF and WBS Headlights	HL6042	4.75
Reflector, Nickel-plated Copper, for Types WCS and WCF Headlights	HL6043	4.75
Glass Holder Ring, for Types WDS and WDF Headlights with 9 $\frac{5}{8}$ " Reflector and Types WBS, WBF, WCS and WCF Headlights	HL6044	.70
Glass Holder Ring, for Types WDS and WDF Headlights with 9 $\frac{3}{8}$ " Reflector	HL6045	.50
Reflector Clamping Ring, for Types WDS and WDF Headlights with 9 $\frac{5}{8}$ " Reflector and Types WCS, WCF, WBS and WBF Headlights	HL6046	.60
Reflector Clamping Ring, for Types WDS and WDF Headlights with 9 $\frac{3}{8}$ " Reflector	HL6047	.60
Conduit Bushing Holder, for Types WDS, WDF, WBS, WBF, WCS and WCF Headlights	HL6048	.45
Hinge Bolt with Nuts, for Types WDS, WDF, WBS, WBF, WCS and WCF Headlights	HL6049	.35
Felt Gasket for Glass Reflector, for Types WDS, WDF, WBS, WBF, WCS and WCF Headlights	HL6050	.20
Rubber Gasket for Glass in Door, for Types WDS, WDF, WBS, WBF, WCS and WCF Headlights (per foot)	HL6051	.15
Screw with Nuts, for Conduit Bushing Holder HL6048. (per dozen)	HL6052	.24
Screw, for Reflector Clamping Ring and Glass Holder Ring (per dozen)	HL827	.30
Adjusting Screw, for Receptacle Bracket HL6012.	HL6095	1.00
Studs and Nuts, for Support	HL6319	.30
Lead Wire (per foot)	HL675	.04

Listings of Headlight Parts

Types WDS, WDF, WBS, WBF, WCS and WCF—Cast Iron

Assembled and Detailed Parts

Description	Catalog Number	List Price Each
Cast-Iron Case, (includes HL6068, 6090 and necessary Screws and Nuts) for Type WDS Headlights	HL6053	\$5.25
Cast-Iron Case, (includes HL6068, 6090 and necessary Screws and Nuts) for Type WDF Headlights	HL6054	5.25
Cast-Iron Case, (includes HL6068, 6090 and necessary Screws and Nuts) for Type WBS Headlights	HL6055	5.25
Cast-Iron Case, (includes HL6068, 6090 and necessary Screws and Nuts) for Type WBF Headlights	HL6056	5.25
Cast-Iron Case, (includes HL6068, 6090 and necessary Screws and Nuts) for Type WCS Headlights	HL6057	5.25
Cast-Iron Case, (includes HL6068, 6090 and necessary Screws and Nuts) for Type WCF Headlights	HL6058	5.25
Receptacle Support, (includes Yokes, Bushings, Washers, Springs and necessary Screws), for Types WDS and WDF Headlights	HL6008	1.80
Receptacle Support, (includes Yokes, Bushings, Washers, Springs and necessary Screws), for Types WBS and WBF Headlights	HL6009	1.80
Receptacle Support and Set Screw, for Types WCS and WCF Headlights	HL6010	1.25
Receptacle Bracket, (includes Studs and Nuts), for Type WDS Headlights	HL6011	1.00
Receptacle Bracket, (includes Studs, Nuts and Adjusting Screw), for Types WBS and WBF Headlights	HL6012	1.50
Receptacle Bracket, (includes Studs and Nuts), for Types WCS and WCF Headlights	HL6064	.75
Plain Rim Door with Fixtures, (includes HL6070, 6087, 5369, 5359 and 6083), for Types WDS, WDF, WBS, WBF, WCS and WCF Headlights	HL6065	3.30
Grid Door with Fixtures, (includes HL5369, 5359, 6084, 6092), for Types WDS, WDF, WBS, WBF, WCS and WCF Headlights	HL6066	3.80
Grid Door with Fixtures, (includes HL6070, 6088, 5359, 5369, 6084, 6092), for Types WBS, WBF, WCS and WCF Headlights	HL6067	3.80
Swivel Locking Bolt, (includes Check Nut, Yoke, Swivel Locking Bolt and Cotter Pin), for Types WDS, WDF, WBS, WBF, WCS and WCF Headlights	HL6068	.50
Lamp Receptacle, for Types WBS, WBF, WCS and WCF Headlights	HL674	.45
Lamp Receptacle, for Types WDS and WDF Headlights	HL6019	.45
Frame for Doors, for Types WDS, WDF, WBS, WBF, WCS and WCF Headlights	HL6070	1.10
Clear Glass, Double Thick, for Types WDS, WDF, WBS, WBF, WCS and WCF Headlights	HL5369	.50
Glass, "Noglare," for Types WDS, WDF, WBS, WBF, WCS and WCF Headlights	HL5357	3.75
Reflector, Gold Glass, for Types WDS and WDF Headlights	HL6028	5.75
Reflector, Gold Glass, for Types WBS and WBF Headlights	HL6030	5.75
Reflector, Gold Glass, for Types WCS and WCF Headlights	HL6031	5.75
Reflector, Crystal Glass, for Types WDS and WDF Headlights	HL6032	5.75
Reflector, Crystal Glass, for Types WBS and WBF Headlights	HL6034	5.75
Reflector, Crystal Glass, for Types WCS and WCF Headlights	HL6035	5.75
Reflector, Aluminum, for Types WDS and WDF Headlights	HL6036	4.25
Reflector, Aluminum, for Types WBS and WBF Headlights	HL6038	4.25
Reflector, Aluminum, for Types WCS and WCF Headlights	HL6039	4.25
Reflector, Nickel-plated Copper, for Types WDS and WDF Headlights	HL6040	4.75
Reflector, Nickel-plated Copper, for Types WBS and WBF Headlights	HL6042	4.75
Reflector, Nickel-plated Copper, for Types WCS and WCF Headlights	HL6043	4.75
Plain Door Glass Holder Ring, for Types WDS, WDF, WBS, WBF, WCS and WCF Headlights	HL6083	.70
Grid Door Glass Holder Ring, for Types WDS, WDF, WBS, WBF, WCS and WCF Headlights	HL6084	1.15
Reflector Clamping Ring, for Types WDS, WDF, WBS and WBF Headlights	HL6086	.60

Listings of Headlight Parts

Types WDS, WDF, WBS, WBF, WCS and WCF (Continued) and Types MBS, MBF, SDP, SAP and SCP Headlights

Types WDS, WDF, WBS, WBF, WCS and WCF—Cast-Iron Headlights—Continued Assembled and Detailed Parts

Description	Catalog Number	List Price Each
Aluminum Spacing Collar for Door, for Types WDS and WDF Headlights	HL6087	\$1.85
Aluminum Spacing Collar for Door, for Types WBS, WBF, WCS and WCF Headlights	HL6088	1.85
Hinge Bolt with Nuts, for Types WDS, WDF, WBS, WBF, WCS and WCF Headlights	HL6089	.45
Reflector Supporting Ring, for Types WDS, WDF, WBS, WBF, WCS and WCF Headlights	HL6090	1.25
Felt Gasket for Reflector Supporting Ring, for Types WDS, WDF, WBS, WBF, WCS and WCF Headlights	HL6091	.20
Rubber Gasket for Glass in Door, for Types WDS, WDF, WBS, WBF, WCS and WCF Headlights (per foot)	HL5359	.15
Screw for Glass Holder Ring, for Types WDS, WDF, WBS, WBF, WCS and WCF Headlights (per dozen)	HL6092	.24
Screw for Reflector Clamping Ring, for Types WDS, WDF, WBS, WBF, WCS and WCF Headlights (per dozen)	HL827	.30
Studs with Nut for Support	HL6320	.30

Types MBS and MBF Headlights—Assembled and Detailed Parts

Case, (includes Hinge, Hinge Bolt and Nuts, Cotter Pins, Swivel Locking Piece Complete and Screw and Nuts), for Type MBS Headlight	HL6400	\$6.75
Case, (includes Hinge, Bolt and Nuts, Cotter Pins, Swivel Locking Piece Complete, and necessary Screws and Nuts), for Type MBF	HL6401	6.75
Receptacle Support with Screws	HL6402	.70
Receptacle Support Bracket	HL6403	.35
Stud with Nut for Support Bracket	HL6404	.30
Lamp Socket	HL674	.45
Door Complete, (includes HL6408, 6409, 6410, 6414, 6416, 6420, 6430 and 6431)	HL6405	8.10
Door Complete, less Semaphore and Doublet Lens	HL6406	3.25
Swivel Lock Piece Complete	HL6407	.50
Door Frame only	HL6408	1.50
8 $\frac{3}{8}$ " Clear Semaphore Lens	HL6409	2.60
6 $\frac{5}{8}$ " Clear Doublet Lens	HL6410	1.90
6 $\frac{5}{8}$ " "Noglare" Doublet Lens	HL6411	3.35
Mirror Reflector	HL6413	2.90
Mirror Reflector Support and Clamping Ring	HL6415	.50
Lens Holder Ring	HL6414	1.05
Doublet Lens Support Ring	HL6417	.65
Doublet Lens Clamping Ring	HL6418	.45
Rubber Packing for Semaphore Lens (per foot)	HL5651	.15
Asbestos Packing for Door (per foot)	HL6420	.20
Screw with Nut and Spacer for Doublet Holder	HL6421	.30
Hinge Bolt with Nuts	HL6089	.45
Screw for Holding HL6403, 6414 and 6415 (per dozen)	HL6428	.12
Screw for Holding Doublet Support Ring to Door Frame (per dozen)	HL6431	.12
Screw with Nut for Hinge (per dozen)	HL6432	.24

Types SDP, SAP and SCP Headlights—Assembled and Detailed Parts

Case, (includes HL62, 2089, 2553, 5085, 6018), for Type SDP Headlight	HL6300	\$7.50
Case, (includes HL62, 2089, 2553, 5085, 6018), for Type SAP Headlight	HL6301	7.50
Case, (includes HL62, 2089, 2553, 5085, 6018), for Type SCP Headlight	HL6302	7.50
Case, (includes HL6018, 6048), for Type SDS Headlight	HL6303	7.50

Listings of Headlight Parts **Types SDP, SAP and SCP (Continued) and Types SDS, SAS and SCS**

Assembled and Detailed Parts

Description	Catalog Number	List Price Each
Case, (includes HL6018, 6048), for Type SAS Headlight	HL6304	\$7.50
Case, (includes HL6018, 6048), for Type SCS Headlight	HL6305	7.50
Door, (includes HL827, 6308, 6321, 6334, 6336), for Types SDP and SDS Headlights	HL6306	4.25
Door, (includes HL827, 6309, 6321, 6334, 6336), for Types SCP, SCS, SAP and SAS Headlights	HL6307	4.25
Door Frame, only, for Types SDP and SDS Headlights	HL6308	2.65
Door Frame, only, for Types SCP, SCS, SAP and SAS Headlights	HL6309	2.65
Receptacle Support, (includes Washers, Bushings, Springs, Yokes, Adjusting Screw, Thumb Nut and necessary Screws and Nuts), for Type SDP Headlight	HL6310	1.80
Receptacle Support, (includes Washers, Bushings, Springs, Yokes and necessary Screws and Nuts), for Types SAP and SAS Headlights	HL6009	1.80
Receptacle Support with Set Screw, for Types SCP and SCS Headlights	HL6313	1.50
Receptacle Bracket, (includes Stud HL6318 and Adjusting Screw and Nuts), for Type SDP Headlight	HL6314	1.80
Receptacle Bracket, (includes Stud HL6320), for Type SDS Headlight	HL6315	1.80
Receptacle Bracket, (includes Stud HL6319 and Adjusting Screws), for Types SAP and SAS Headlights	HL6316	1.50
Receptacle Bracket, (includes Stud HL6320), for Types SCP and SCS Headlights	HL6317	.75
Stud for Receptacle Bracket, for Type SDP Headlight	HL6318	.30
Stud for Receptacle Bracket with Nut, for Types SAP and SAS Headlights	HL6319	.30
Stud for Receptacle Bracket with Nut, for Types SCP and SCS Headlights	HL6320	.30
Bumper Stud, (includes HL190, 5093), for Types SDP, SDS, SAP, SAS, SCP and SCS Headlights	HL2089	1.05
Rubber Tip and Screw, for Bumper Stud HL2089	HL190	.30
Lock Nut, for Bumper Stud HL2089	HL5093	.14
Single Binding Post, for Types SDP, SAP and SCP Headlights	HL5047	1.15
One-Point Plug, for Types SDP, SAP and SCP Headlights	HL2103	1.60
Lead Wire, for Plug HL2103 (per foot)	HL104	.12
Guard Spring, only, for Plug HL2103	HL5090	.35
Wooden Handle, for Plug HL2103	HL103	.70
Plug Point, for Plug HL2103	HL102	.58
Porcelain Entrance Bushing with Clamp, for Types SDP, SAP and SCP Headlights	HL2553	.45
Glass, for Doors HL6306, 6307	HL6321	.65
Reflector, Gold Glass, for Types SDP and SDS Headlights	HL6322	12.25
Reflector, Gold Glass, for Types SCP and SCS Headlights	HL6323	12.25
Reflector, Gold Glass, for Types SAP and SAS Headlights	HL6324	12.25
Reflector, Crystal Glass, for Types SDP and SDS Headlights	HL6325	12.25
Reflector, Crystal Glass, for Types SCP and SCS Headlights	HL6326	12.25
Reflector, Crystal Glass, for Types SAP and SAS Headlights	HL6327	12.25
Reflector, Aluminum, for Types SDP and SDS Headlights	HL6328	7.10
Reflector, Aluminum, for Types SCP and SCS Headlights	HL6329	7.10
Reflector, Aluminum, for Types SAP and SAS Headlights	HL6330	7.10
Reflector, Nickel-plated Copper, for Types SDP and SDS Headlights	HL6331	7.85
Reflector, Nickel-plated Copper, for Types SCP and SCS Headlights	HL6332	7.85
Reflector, Nickel-plated Copper, for Types SAP and SAS Headlights	HL6333	7.85
Rubber Gasket, for Doors HL6306, 6307 (per foot)	HL5653	.15
Felt Gasket, for Glass Reflectors, for Types SDP, SDS, SAP, SAS, SCP and SCS Headlights	HL6335	.30
Glass Holder Ring, for Doors HL6306, 6307	HL6336	1.00
Lamp Receptacle, for Types SDP and SDS Headlights	HL6019	.45
Lamp Receptacle, for Types SAP, SAS, SCP and SCS Headlights	HL674	.45
Aluminum Spacing Collar, for Receptacle HL674, for Types SAP, SAS, SCP and SCS Headlights	HL6338	.55
Hanger, Hook and Leg, for Types SDP, SAP and SCP Headlights	HL5085	1.00
Front Leg, for Cases HL6300, 6301, 6302	HL9688	.58
Hinge Bolt with Nut, for Types SDP, SDS, SAP, SAS, SCP and SCS Headlights	HL9049	.35

Listings of Headlight Parts

Types SDP, SDS, SAP, SAS, SCP and SCS (Continued) and Types I and MC

Types SDP, SDS, SAP, SAS, SCP and SCS Headlights—Continued Assembled and Detailed Parts

Description	Catalog Number	List Price Each
Screw with Nut, for Attaching Hanger to Cases HL6300, 6301, 6302 (per dozen)	HL6340	\$.24
Screw with Nut, for Binding Post HL5047	HL6341	.24
Screw with Nut, for Attaching Receptacle HL674 to Supports HL6312, 6313, for Types SAP, SAS, SCP and SCS Headlights (per dozen)	HL6342	.24
Screw with Nut; for Attaching Receptacle HL6019 to Supports HL6310, 6311, for Types SDP and SDS Headlights (per dozen)	HL6343	.24
Screw for Glass Holder Ring HL6336 (per dozen)	HL827	.30
Locking Device with Pin for Doors, for Types SDP, SDS, SAP, SAS, and SCS Headlights	HL6018	.35
Conduit Bushing Holder, for Types SDS, SAS and SCS Headlights	HL6048	.45
Adjusting Socket Screw, for Types SAP and SAS Headlights	HL6344	.60
Adjusting Socket Screw, for Types SDP and SDS Headlights	HL6345	1.30

Type I (Mine) Headlight—Assembled Parts

Case with Mechanism, (includes HL3605, 3607, 3608, 2553)	HL3609	\$4.30
Lamp Receptacle, on Bracket and Wired, (includes HL605, 673, 674, 675)	HL3605	1.10
Reflector Equipment, (includes Reflector Form and Aluminum Reflector and Screw)	HL3607	2.75
Case, (includes HL608, 2553)	HL3608	3.10
Case with Door, (includes HL3608, 3610)	HL3620	5.50
Door, (includes HL609, 610, 3680, 5142)	HL3610	2.40

Type I (Mine) Headlight—Detailed Parts

Receptacle Bracket	HL605	\$.45
Lamp Receptacle	HL674	.45
Screw with Nut for Lamp Receptacle (per dozen)	HL673	.75
Hinge Bolt with Nut for Case	HL587	.09
Frame for Door	HL610	2.15
Lead Wire (per foot)	HL675	.04
Catch Pin with Chain	HL569	.45
Plain Glass for Door	HL609	.45
"Noglare" Glass for Door	HL5919	3.25
Rubber Packing for Glass (per foot)	HL5142	.15
Glass Holder Bracket	HL3680	.10
Bushing with Clamp	HL2553	.45
Screw for Reflector (per dozen)	HL578	.45

Type MC (Mine) Headlight Pressed Steel—Assembled Parts

Case, (includes HL6556, 6555, 2553 and necessary Screws and Nuts)	HL6551	\$ 7.80
Door, (includes HL6557, 6568, 6569, 6570 and 827)	HL6553	7.30
Lamp Receptacle, (includes HL674, 6558, 6559, 6560 and necessary Screws and Nuts)	HL6555	1.70
Turret Base Complete	HL5671	13.35
Base Plate, for Turret Base, HL5671	HL5672	6.00
Top Plate, for Turret Base, HL5671	HL5673	7.35
Plunger Complete, (includes HL545, 5674, 5675, 5777) for Turret Base, HL5671	HL5153	1.75

Type MC (Mine) Headlight Pressed Steel—Detailed Parts

Case Frame	HL6556	\$5.20
Door Frame	HL6557	3.75
Reflector Clamping Ring for Glass Reflector	HL6046	.60
Screw for Glass Holder and Reflector Clamping Ring (per dozen)	HL827	.30
Glass Holder Ring	HL6044	.70
Screws with Nuts for Support (per dozen)	HL6561	.60
Hinge Bolt with Nuts	HL6049	.35
Felt Gasket for Glass Reflector	HL6050	.20

Listings of Headlight Parts

Types MC (Continued) and MD

Type MC (Mine) Headlight—Pressed Steel—Detailed Parts—Continued

Description	Catalog Number	List Price Each
Lamp Receptacle Base	HL6558	\$1.20
Lamp Receptacle Base Support	HL6559	.35

Type MC (Mine) Headlight—Cast Iron—Assembled Parts

Case, (includes HL 2553, 807, 4063, 6068, 6090 and necessary Screws and Nuts)	HL6706	\$ 5.80
Door, (includes HL6568, 6051, 6420, 6710, 6709, 6711)	HL6707	5.40
Lamp Receptacle on Base and Wired, (includes HL674, 6010, 673, 675)	HL6708	1.80
Receptacle Bracket, (includes HL6320)	HL6064	.75
Turret Base Complete, (includes HL5672, 5673, 5153)	HL5671	13.35
Plunger Complete, (includes HL545, 5674, 5675, 5677 for Turret Base HL5671)	HL5153	1.75
Base Plate, for Turret Base, HL5671	HL5672	6.00
Top Plate, for Turret Base, HL5671	HL5673	7.35

Type MC (Mine) Headlight—Cast Iron—Detailed Parts

Door Frame.	HL6709	\$1.80
Glass Holder Ring	HL6710	.70
Asbestos Packing for Door (per foot)	HL6420	.20
Screws for Glass Holder Ring (per dozen)	HL6711	.12
Lamp Receptacle Base and Set Screw	HL6010	1.25
Receptacle Bracket only	HL6712	.35
Screws and Nuts for Lamp Receptacle (per dozen)	HL673	.75
Felt Gasket for Reflector Supporting Ring	HL6091	.20
Reflector Clamping Ring	HL6086	.60
Screws for Reflector Clamping Ring (per dozen)	HL827	.30
Swivel Locking Piece for Top of Case	HL4063	1.50
Swivel Locking Pieces for Bottom of Case	HL6068	.50
Hinge Bolt and Nut	HL807	.09
Reflector Supporting Ring	HL6090	1.25

Detail Parts Common to Pressed Steel and Cast Iron Type MC (Mine) Headlight

Wire Glass	HL6568	\$1.50
Rubber Packing (per foot)	HL6051	.15
Studs with Nuts for Receptacle Bracket	HL6320	.30
Lamp Receptacle	HL674	.45
Lead Wire (per foot)	HL675	.04
9 $\frac{5}{8}$ " Reflector, Gold Glass	HL6031	5.75
9 $\frac{5}{8}$ " Reflector, Crystal Glass	HL6035	5.75
9 $\frac{5}{8}$ " Reflector, Aluminum	HL6039	4.25
9 $\frac{5}{8}$ " Reflector, Nickel-plated Copper	HL6043	4.75
Bushing with Clamp	HL2553	.45
Base Plate for Turret Base	HL5672	6.00
Top Plate for Turret Base	HL5673	7.35
Plunger	HL545	.65
Plunger Collar	HL5674	.65
Plunger Spring	HL5675	.45
Plunger Bracket	HL5677	.65

Type MD (Mine) Headlight—Pressed Steel—Assembled Parts

Case Complete, (includes HL6648, 2553, 6643 and 6634 consisting of seven Resistance Coils)	HL6631	\$13.50
Case, with Self-Contained Resistance Compartment	HL6635	9.50
Case, only	HL6717	3.70
Door Complete	HL6632	5.10
Lamp Socket on Bracket and Wired	HL6633	3.65
Resistance Coils Complete, (includes HL6642, 5227, 2794, 2795) (per set)	HL6634	4.40

Listings of Headlight Parts

Types MD—Continued

Type MD (Mine) Headlight—Pressed Steel—Detailed Parts

Description	Catalog Number	List Price Each
Door Frame	HL6636	\$2.85
Reflector and Glass Holder Screw (per dozen)	HL827	.30
Glass-Holder Ring	HL6638	.60
Rubber Packing (per foot)	HL6051	.15
Back for Resistance	HL6643	1.10
Cover for Resistance	HL6644	.70
Hinge Bolt with Nuts	HL6049	.35

Type MD (Mine) Headlight—Cast Iron—Assembled Parts

Case with Self-Contained Resistance Compartment, (includes HL6690, 6698, 6700, 6713 and 6634 consisting of seven Resistance Coils) (per set)	HL6716	\$14.30
Case, with Self-Contained Resistance Compartment, (includes HL6690, 6698, 6700, 6713)	HL6714	9.90
Case, (includes HL4063, 6068, 807, 2553, 6702 and necessary screws and nuts)	HL6690	5.15
Door, (includes HL6693, 6637, 6694, 6695, 6696, 6697)	HL6691	4.10
Lamp Receptacle on Base and Wired, (includes HL6639, 6640, 6641, 6646, 675)	HL6692	3.60
Resistance Coils Complete, (includes HL6642, 5227, 2794, 2795) (per set)	HL6634	4.40

Type MD (Mine) Headlight—Cast Iron—Detailed Parts

Door Frame	HL6693	\$1.45
Rubber Packing (per foot)	HL6694	.15
Glass Holder Ring	HL6695	.55
Asbestos Packing for Door (per foot)	HL6696	.20
Screws for Glass Holder Ring (per dozen)	HL6697	.12
Screws and Nuts for Lamp Receptacle (per dozen)	HL673	.75
Swivel Locking Piece for Top of Case	HL4063	1.50
Swivel Locking Pieces for Bottom of Case	HL6068	.50
Hinge Bolt and Nuts	HL807	.09
Reflector Supporting Ring	HL6702	1.00
Reflector Clamping Ring	HL6703	.55
Felt Gasket for Reflector Supporting Ring	HL6704	.20
Compartment for Self-Contained Resistance	HL6698	1.80
Top for Resistance Compartment	HL6700	.75
Back for Resistance Compartment	HL6713	1.10
Screws for Reflector Clamping Ring (per dozen)	HL827	.30

Detail Parts Common to Pressed Steel and Cast Iron Type MD (Mine) Headlight

Wire Glass for Door	HL6637	\$ 1.25
Lamp Socket	HL6640	1.25
Lamp Socket Support	HL6641	2.00
Wire Bushing and Clamp	HL2553	.45
Lead Wire (per foot)	HL675	.04
Resistance Tube only	HL5227	.47
Wire for Resistance Tube (per pound, in less than pound lots)	HL6642	12.00
Resistance Clamp Support, Side Slot	HL2794	.40
Resistance Clamp Support, End Slot	HL2795	.40
6½" Crystal Glass Reflector	HL6699	4.00
6½" Copper Nickel-plated Reflector	HL6701	3.50
Screws with Nuts for Holding Resistance Coil to Case (per dozen)	HL6647	.60
Binding Post	HL6648	1.10
Lamp Bracket (for Metal Reflector)	HL6639	.50
Lamp Bracket (for Glass Reflectors)	HL6705	.50
Set Screw for Lamp Receptacle (per dozen)	HL6646	.36

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HL10258	64			61, 65	HL3409 . . .	3.90	59
HL10370	64			66, 67	HL3410 . . .	3.65	59
HL10412**	64	HL67630*	57, 59	HL341118	59
HL10540	44	HL677 . . .	3.10	56, 57	HL3414 . . .	1.80	59
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HL13475	45	HL68409	56, 57	HL343385	59
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HL150S . . .	4.40	47	HL686 . . .	1.10	56	HL3480 . . .	2.90	59
HL151S . . .	4.40	47	HL68745	56, 57	HL348175	59
HL152S . . .	4.40	47	HL688 . . .	1.30	56, 58	HL348260	59
HL153S . . .	4.40	47	HL689 . . .	1.55	56	HL3483 . . .	2.45	59
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HL155S . . .	4.40	47	HL69150*	56, 57	HL3607 . . .	2.75	65
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HL40536	59	HL692 . . .	1.35	56	HL3609 . . .	4.30	65
HL40618	59	HL693 . . .	2.60	56, 57	HL3610 . . .	2.40	65
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HL41445	59	HL802 . . .	1.85	56	HL367285	56
HL41530*	60	HL803 . . .	3.70	57	HL368010	56, 57
HL41810	59	HL80445	57, 59			58, 59
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HL46330	60	HL812 . . .	1.55	57	HL4003 . . .	5.75	56
HL46445	60	HL81345	57	HL400445	56
HL46518	60	HL814 . . .	1.35	57	HL4007 . . .	4.90	56
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HL48936*	60	HL819 . . .	1.55	57	HL4013 . . .	2.50	56
HL54565	66	HL82050*	58	HL4014 . . .	2.95	56
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* Per dozen. ** Per foot.

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* Per dozen. ** Per foot.

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HL640335	63	HL664636*	67	24855 . . .	8.85	13
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HL6409 . . .	2.60	63	HL668928*	47	24913 . . .	8.95	9
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HL6557 . . .	3.75	65	HL6706 . . .	5.80	66	28260 . . .	15.85	26
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HL655935	66	HL6708 . . .	1.80	66	28290 . . .	15.85	27
HL656160*	65	HL6709 . . .	1.80	66	28291 . . .	15.85	27
HL6568 . . .	1.50	66	HL671070	66	28320 . . .	15.85	30
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HL661530	47	17882 . . .	16.35	18	28519 . . .	15.85	23
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HL661714*	47	17884 . . .	3.70	18	28531 . . .	7.00	9
HL661807*	47	24093 . . .	6.40	9	28532 . . .	9.05	9
HL661912	47	24095 . . .	6.80	9	28533 . . .	7.00	11
HL662017	47	24097 . . .	8.45	9	28534 . . .	9.05	11
HL662106	47	24109 . . .	7.35	41	28535 . . .	7.35	13
HL662217*	47	24110 . . .	6.40	11	28536 . . .	9.45	13
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HL6636 . . .	2.85	67	24153 . . .	6.80	11	28542 . . .	11.10	17
HL6637 . . .	1.25	67	24155 . . .	8.45	11	28543 . . .	15.85	26
HL663860	67	24159 . . .	8.95	11	28544 . . .	15.85	26
HL663950	67	24801 . . .	6.75	13	28545 . . .	13.50	26
HL6640 . . .	1.25	67	24803 . . .	7.15	13	28546 . . .	13.50	26
HL6641 . . .	2.00	67	24805 . . .	8.85	13	28547 . . .	15.85	27
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* Per dozen. ** Per foot. † Per pound. ‡ Per set.

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28551 . . .	15.85	30	28588 . . .	5.00	45	28644 . . .	9.45	9
28552 . . .	15.85	30	28589 . . .	6.50	45	28645 . . .	7.40	11
28553 . . .	13.50	30	28590 . . .	8.70	45	28646 . . .	9.45	11
28554 . . .	13.50	30	28591 . . .	12.25	45	28647 . . .	7.80	13
28555 . . .	15.85	31	28592 . . .	8.70	45	28648 . . .	9.95	13
28556 . . .	15.85	31	28593 . . .	12.25	45	28649 . . .	8.95	17
28557 . . .	13.50	31	28594 . . .	8.70	45	28650 . . .	8.95	17
28558 . . .	13.50	31	28595 . . .	12.25	45	28651 . . .	9.55	17
28559 . . .	15.85	22	28596 . . .	8.70	45	28652 . . .	10.95	17
28560 . . .	15.85	22	28597 . . .	12.25	45	28653 . . .	10.95	17
28561 . . .	13.50	22	28598 . . .	8.70	45	28654 . . .	11.55	17
28562 . . .	13.50	22	28599 . . .	12.25	45	28663 . . .	7.83	42
28563 . . .	15.85	23	28600 . . .	8.70	45	28664 . . .	8.83	42
28564 . . .	15.85	23	28601 . . .	12.25	45	28665 . . .	9.33	42
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28566 . . .	13.50	23	28603 . . .	7.90	45	28667 . . .	7.70	43
28567 . . .	33.50	39	28604 . . .	6.50	45	28668 . . .	8.70	43
28568 . . .	33.50	39	28605 . . .	9.35	45	28669 . . .	13.70	43
28569 . . .	29.00	39	28606 . . .	12.25	45	28670 . . .	13.20	43
28570 . . .	25.95	39	28607 . . .	15.10	45	28671 . . .	15.00	43
28571 . . .	25.95	39	28608 . . .	12.25	45	28672 . . .	14.50	43
28572 . . .	21.45	39	28609 . . .	15.10	45	28673 . . .	9.20	43
28573 . . .	33.50	37	28610 . . .	12.25	45	28674 . . .	10.20	43
28574 . . .	33.50	37	28611 . . .	15.10	45	28675 . . .	5.00	45
28575 . . .	29.00	37	28612 . . .	12.25	45	28676 . . .	4.60	45
28576 . . .	25.95	37	28613 . . .	15.10	45	28677 . . .	6.00	45
28577 . . .	25.95	37	28614 . . .	12.25	45	28678 . . .	7.15	45
28578 . . .	21.45	37	28615 . . .	15.10	45	28679 . . .	9.35	45
28579 . . .	33.50	35	28616 . . .	12.25	45	28680 . . .	6.50	45
28580 . . .	33.50	35	28617 . . .	15.10	45	28681 . . .	5.00	45
28581 . . .	29.00	35	28618 . . .	10.50	17	28682 . . .	7.90	45
28582 . . .	40.00	35	28619 . . .	10.50	17	28683 . . .	9.35	45
28583 . . .	25.95	35	28620 . . .	7.35	41	28684 . . .	12.25	45
28584 . . .	25.95	35	28641 . . .	18.70	43	28713 . . .	7.85	41
28585 . . .	21.45	35						













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